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MEASURED CORRECTION OF SQUINT BY COMBINED TECHNIQUE

W. HOLBROOK LOWELL, M.D.

BOSTON

Using the Bishop tucker, the under acting muscle is shortened by tucking, reckoning one millimeter of shortening for five degrees of turning; and by means of the writer's special double-jawed fixation forceps the overacting muscle is lengthened by two transverse cuts on one side and one intermediate transverse cut on the other side of the muscle. The method was demonstrated at the Clinical Congress of the American College of Surgeons, Boston, October 12, 1928, and the paper was read before the New England Ophthalmological Society, November 20, 1928.

It is not within the scope of this paper to deal with fusion (so ably covered by Worth in his book), or to offer the data which may be found in any good textbook on ophthalmology, but to describe an operation in which known methods are combined for the correction of squint.

For the first ten years of practice, the writer performed a Worth advancement with tenotomy. That this procedure is not wholly satisfactory is well shown by the fact that in Wood's System of Ophthalmic Surgery twenty-one different methods are described. Many methods have been published in the last few years. They have all added to our knowledge, but not one procedure is without some complication, either during the operation or in the after care.

The writer realizes that his confrères, all over the country, are getting good primary results. The question is, do they approach the operation with no fear of perforating the sclera, of the stitches slipping or cutting out, or of later secondary divergence following a complete tenotomy. Greenwood¹, at Denver, spoke of two cases seen in consultation in which eyes had been lost from infection due to the needle perforating the sclera. One patient lost the unoperated eye from sympathetic ophthalmia, and the operated eye was enucleated. Danger of the stitches slipping or cutting out

is shown very clearly by Wells and Sternberg². They say: "In several cases one suture was found to have cut out of the scleral attachment. In a few cases both scleral stitches had cut out and union had taken place two or three millimeters farther back than intended." Secondary divergence is still a not infrequent occurrence, as shown by McKellar³ in a late article: He says: "Secondary divergence is always the result of complete tenotomy of the internus done in earlier life, generally during childhood. It frequently does not make its appearance for months or years after the time of operation. The resultant effect in these cases is more disfiguring than the original condition, especially if there is a retraction of the caruncle, which gives the eye a glassy, unnatural appearance. Having seen so many of these undesirable ultimate results, I have come to the conclusion, as have many operators, that, eminently satisfactory though the primary result of uncontrolled tenotomy of the internal rectus often is, it is not a scientific procedure and should be discarded in favor of recession; or at least that a controlling stitch should be used."

Simplicity and exactness should go hand in hand in any operation, because it means less traumatism and therefore a more rapid and comfortable convalescence. We have heard

for years of the inexactness of medical science, but we can at least plead to approximate exactness, although we are not dealing with wood or iron, but growing tissue.

The shortening of a muscle without dividing its fibers seems to have been done first by de Wecker (according to Howe⁴).

For operating on squint cases, the writer has had in mind for some time the hope of developing a method which would be simple and approximately exact. In 1926, J. W. Lowell, described an operation for squint, based on muscle work done with George and Toren⁵, which led the writer to evolve the technique to be described.

For shortening, any tucker may be used, but the Bishop was found the most satisfactory. For lengthening the opposite muscle, a "tendon muscle lengthening" is done according to Todd⁶ and as reported by the writer in 1914. The writer's⁷ special double-jawed fixation forceps are used. They hold the muscle and serve as a guide while making the cuts. Some such guide is indispensable if cuts are to be made with any degree of accuracy.

The following technique has been taught by the writer for the past three years in the ophthalmic operative course for graduates, Harvard Medical School, at the Massachusetts Eye and Ear Infirmary. The method has been used during his term of service by himself and staff for the same length of time, with most gratifying results.

In order that there may be no misunderstanding, the operation will be described in a case of convergent strabismus. The external rectus is to be shortened and the internal rectus lengthened. The number of arc degrees of turning is taken on the perimeter as usual. In this case there were forty arc degrees of strabismus at the near point. The muscle, then, is to be shortened eight millimeters, as it is generally conceded that "five degrees of arc are equal approximately to one millimeter of muscle shortening".⁸

The operation

Local or general anesthesia may be used, as the cooperation of the patient is not necessary. The skin about the eye, cheek, side of nose, and so on is painted with a two per cent tincture of iodine solution to render it as sterile as possible.

The tucking is always to be done first. The external rectus is exposed by making a conjunctival flap, the convex portion being two to three millimeters from the sclerocorneal margin, and the legs extending out one centimeter or more if necessary. The muscle, with its tendon, is isolated so that two strabismus hooks may easily be passed under it in opposite directions. Three millimeters more than is needed for the tuck should be freed.

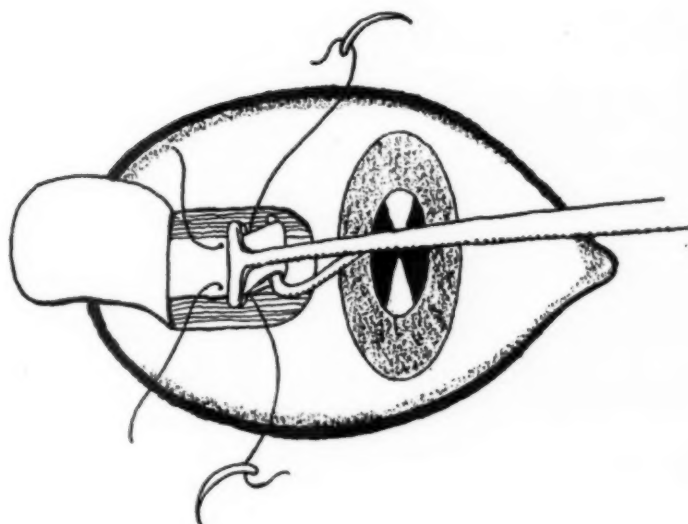
The hook of the Bishop tucker, which has been screwed down between the parallel bars, is passed under the muscle equidistant from its exposed limits. The knurled screw is now turned, drawing the muscle up between the bars for four millimeters (eight millimeters of shortening, as the muscle is doubled) measuring with a small celluloid rule from the top of the tuck to the lower edge of the parallel bars. It has not been found necessary to allow for stretching of the muscle with this technique.

A full curved needle is used, threaded with no. 4 twisted white silk suture. This is sterilized by boiling.

The needle is passed under the parallel bars of the tucker, through the doubled muscle 1.5 mm. from its edges. A surgeon's knot is tied over the included edges. A like suture is placed at the opposite edges of the doubled muscle. In this manner the central portion of the muscle is not constricted, leaving a chance for circulation and nerve supply. The silk tuck sutures are to be left to absorb, as they do in some months. Several years after a modified Mules operation the stump was removed in which buried silk sutures had been used. They had entirely disappeared.

To close the wound, Greenwood's¹ method is followed. He says: "The

Right Eye IA



II A

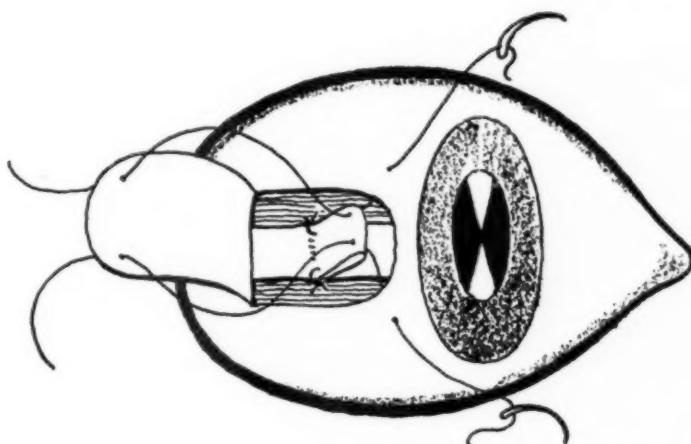


Fig. 1 (Lowell). Measured correction of squint by combined technique.

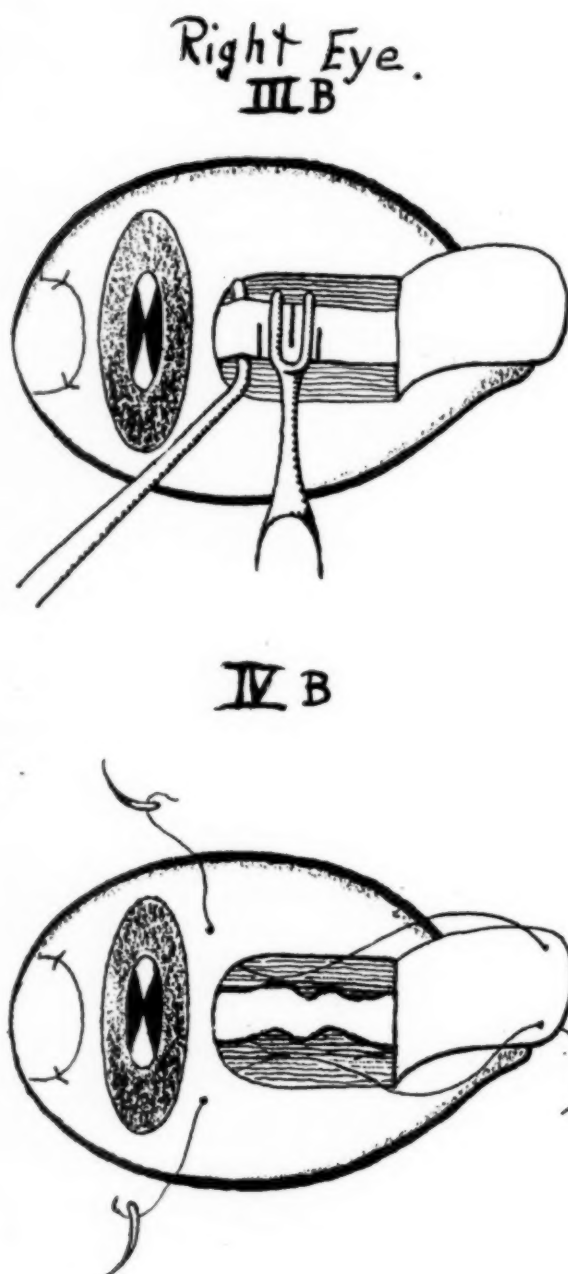


Fig. 2 (Lowell). Measured correction of squint by combined technique.

tuck is standing up in the wound. Two sutures are then passed through the conjunctival flap, one above and one below, each one then passed through a corner of the tuck and then under the conjunctiva, terminating at the limbus, the lower one low down and the upper one high up. When these are drawn up, it pulls the tuck forward, flat down on the sclera, and stretches the tuck out, and of course covering the whole wound of the conjunctiva." If the tuck is small (one to two millimeters) the two sutures are used without including the tuck.

The next step is to lengthen the opposite muscle, in this case the internal rectus. The muscle is exposed by a convex flap like the one already described. The strabismus hooks must slide freely under the isolated muscle as in the former description. Then the lower blades of the fixation forceps⁷ are passed under the muscle between the separated hooks and close up to the one next the muscle's attachment, and clamped down. The hooks are now removed and the cuts in the muscle made, two on one edge a little over one-half way through, outside the forceps blades, and one on the opposite edge between the forceps blades three-quarters way through.⁸ Notches on the blades guide the operator in making the cuts the right length.

As the internal rectus is on tension due to the shortening of the external rectus, the moment the cuts are completed the globe swings into the central position, showing that the in-

ternal rectus has lengthened approximately equal to the amount of shortening of the external rectus.

The conjunctival flap is now sutured, and a drop of one per cent atropine solution and White's ointment are applied to each eye. Both eyes are bandaged and kept bandaged for four days. The dressing is changed every day and White's ointment used. The patient is kept in bed for five days, as he is quieter there and less likely to move his eyes about. The conjunctival sutures are removed on the seventh day.

Conclusions

In this operation there are no "bow-knot" sutures to be loosened or tightened. Cooperation of the patient with its attendant nervous strain is not necessary. There are no scleral stitches to cut out, to slip, or to be removed later. There are no stay or anchor sutures. The cosmetic results in operations adhering to the aforesaid technique have been equally good.

The writer especially wishes to thank his staff, Drs. Carroll, Mackenzie, and Wilkins, and the house surgeons for their whole-hearted, enthusiastic cooperation.

The Bishop tucker is made by Mueller and Company of Chicago, and the writer's double-jawed fixation forceps by Codman and Shurtleff of Boston. These two instruments, most needed in this operation, are mentioned as this may save later inquiries.

82 Commonwealth avenue

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A CASE OF TRICHINOSIS WITH EXOPHTHALMOS

BEN WITT KEY, M.D., F.A.C.S.

NEW YORK CITY

The violence of the parasitic invasion in this case is shown in the varied manifestations of the disease—exophthalmos simulating orbital cellulitis from sinusitis; marked edema with discoloration of the face, lids, and conjunctiva; visual disturbance; irritable heart; temperature 104.5° F.; eosinophilia 74 per cent. Muscle section from the deltoid revealed the trichinella spiralis. Recovery followed symptomatic treatment and neosalvarsan. Suggestion is made as to the cause of the visual disturbance. Read before the American Ophthalmological Society, April 30, 1928.

The parasitologist claims a peculiar interest, even to a fascination, in his study and search for the true character, habits, and life cycle of a parasite, as well as its geographical and zoological distribution. This has been compared to the sport experienced in fishing for trout! The history of parasitology abounds in self-sacrifice even to the point of great danger and death, all for the purpose of learning the truth concerning a parasite's cycle of life. Scarcely less interesting or even fascinating is the study of the clinical picture presented by the host during the course of parasitic invasion. For this reason, as well as because of the important significance of the disease to the ophthalmologist, this case of trichinosis is presented.

L. S., aged twenty-five years, single, a native of Germany and a bank clerk by occupation, was first seen on May 24, 1927, complaining of tearing, puffiness of the lids, and headache. He gave a definite but apparently unimportant history. For the past two or three days he had felt weak and feverish, and had had some gastric disturbance, but without vomiting or pain. He had been a resident of this country only six months. His parents lived in Germany and were in good health. His previous medical history was of no importance.

On examination there was observed some edema of the face, especially noticeable about the eyes. The conjunctiva of each eye was chemotic, the right more marked than the left, and

that of the lower fornix so edematous that the conjunctiva protruded over the lower lid margins and was in contact with the skin of the lower lids. This protruding conjunctiva was only slightly congested, but the subconjunctival fluid was a striking yellowish color, as though affected by jaundice. The right eye was markedly proptosed and was directed downward and a trifle nasalward. Both corneæ, irides, and pupils were normal. The vision of each eye was 20/16. His temperature was 102.5° F.

On the following day he was admitted to the New York Eye and Ear Infirmary with the provisional diagnosis of paranasal sinusitis with orbital involvement. A thorough laboratory investigation was made. It was found that the urine was normal, the Wassermann negative. The differential blood count showed small lymphocytes 10, large lymphocytes 2, transitionals 1, polymorphonuclears 26, and eosinophiles 69 per cent. The whites numbered 24,000, the reds 5,000,000. An x-ray picture of the sinuses was negative. Examination of the stools for parasites and ova was negative. On May 27 (two days after admission) a small section of the left deltoid muscle was excised and teased under the microscope by Mr. Burchell. It revealed the curled-up baby *Trichinella spiralis*, a photomicrograph of which is shown in the illustration (fig. 1).

Dr. Walter Lester Carr, making a physical examination, noted the edema

of the face and eyes, the sallow pale complexion, perhaps a suggestion of yellowish color; some soreness of the large muscles (deltoid and trapezius), no edema of the legs; no splenic enlargement, no headache, no nausea. Only a few coarse râles could be found in the chest. The cardiac muscle sounds were poor and intermittent, the heart action irritable; the pulse irregular and rapid.

as 104.5°F. It was somewhat irregular but with a tendency toward the septic type (fig. 2). The blood pressure was low, varying little—100/65 to 105/65. The pulse varied in rate from 88 to 130; respirations were 26 to 36.

During the height of the attack an interesting ocular feature of the disease was the variation in acuity of vision, on one occasion V. O.D.=20/20, O.S. 20/30; again O.D. 20/30, O.S. 20/40—;

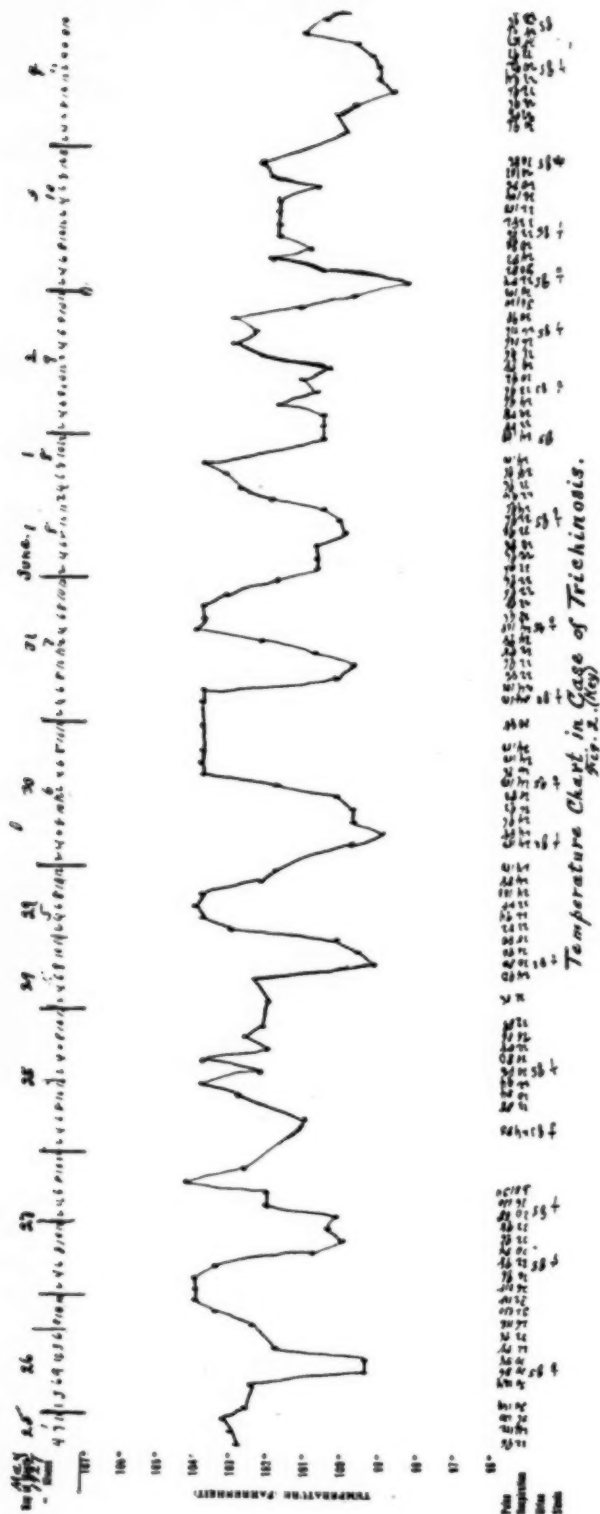


Fig. 1 (Key). Embryo trichinella spiralis in deltoid muscle section.

Needless to state that after the differential white count showed a high eosinophilia of sixty-nine per cent, a history was secured to the effect that for four or five days prior to his illness he had been eating, almost daily, raw ham for his dinner, having been accustomed to frequent resort to such a diet in Germany.

The acute course of the disease lasted seventeen days, during which time the temperature chart was interesting, especially as the curve reached as high

again O.D. 20/30, O.S. 20/20—. Repeated fundus examinations revealed only a mild congestion (if any) of the nervehead, and the vitreous of each eye was clear and transparent. Not until the regression stage of the disease began did the edema of the face and eyes disappear, but the chemotic conjunctiva and exophthalmos slowly passed away during the period of "digression", five or six days before the facial edema showed any change whatever.



The blood count, made every four or five days, showed an interesting variation typical of the trichina's activity, passing its life cycle in the intestines, in the blood and lymph circulation, and in the muscles of its host.

	Hb. %	Reds	Whites
May 26	95	5,000,000	24,000
June 2	95	5,000,000	27,000
June 6	90	4,500,000	10,000
June 13	75	4,500,000	13,200
June 19	80	4,500,000	13,000

Small lympho.	Large lympho.	Poly.	Eosin.
10	2	26	69
3	2	19	72
4	6	14	74
34	6	25	32
25	3	41	30

The treatment consisted of calomel followed by magnesium sulphate, every four days; thymol, three grains, twice a day; Tinct. digitalis ten minims, three times a day; neosalvarsan, 0.2 gm., every three to four days (six doses were administered). The eyes received warm boric acid irrigation three times a day.

He was discharged from the hospital nineteen days after admission, and soon thereafter resumed his work.

It is interesting and instructive to recall that trichina enter the stomach of man by ingestion of raw pork containing the larvæ of the parasite. In the stomach the capsule that encloses the living trichinæ in the muscular tissue is dissolved and the parasites pass into the intestines, where in two or three days they develop into adult sexual forms and breed. A female trichinella lives in the intestinal mucosa five to eight weeks, and after the first week produces at least 1500 embryos. These soon pass into the voluntary muscle tissue, chiefly by the blood and lymphatic circulation. The embryos enter the muscle fibers, where they develop into muscle trichinæ and encapsulate within three to twelve weeks. After three to six months,

calcification of the capsule begins, which often is not complete for fifteen or sixteen months.

The encapsulated trichinæ may live for years, according to Groenouw. Cases have been reported (Stiles) in which it is maintained that the encysted parasites retained their vitality from five to twelve years in man and eleven to twenty-four years in the hog.

The parasites are found to be most numerous in the diaphragm, then in order in the intercostal, cervical, laryngeal, and eye muscles, and finally in the muscles of the extremities. The heart muscle and the muscles of the internal organs are only exceptionally invaded, the smooth muscles not at all. In relation to the percentage involvement in trichinosis, the eye muscles are on a par with the laryngeal and abdominal muscles. In the diaphragm trichinæ are present seven times, in the scapular muscles four times, in the psoas muscles three times, and in the posterior flexor muscles of the thigh twice as frequently as in the eye muscles (Kuhn, 1865).

The time between the ingestion of the infected pork and the onset of the first symptoms depends primarily upon the number of larvæ of the parasite ingested; it varies from two days to five weeks.

The outstanding ocular feature of this case was the well defined exophthalmos (right eye), associated with marked edema of the orbit and yellowish discoloration of the subconjunctival fluid of both eyes. These symptoms are believed to be due to direct invasion of the ocular muscles by the parasitic embryos rather than to their toxic influence. But Groenouw, Mauer, and others attribute the marked edema partly to thrombus formation in the veins and partly to vasomotor disturbances. The latter apparently are due to the action of toxins contained in the capsule of the trichinæ; these toxins enter the gastrointestinal canal and thence reach the blood.

There was, however, in this case no severe pain on motion of the eyes, nor were the eyeballs rigid in fixation, as

reported by other observers. Neither was there any pupillary irregularity or dilatation, nor was there any demonstrable interference with accommodation, as reported by Groenouw, Kittel, Rupprecht and others, and believed to be due to the action of a toxin.

The marked edema of both orbits and the intermittent pulse suggested irritation of the thyroid, but the temperature, the skin reaction, and the absence of encysted larvæ in the thyroid gland argued to the contrary, although the possibility of a toxic influence upon the thyroid could not be ruled out. The discoloration of the subconjunctival fluid, together with the appearance of the skin, also suggested a toxic cause.

Edema of the face and lids, with chemosis of the conjunctiva, is the most prominent and characteristic physical sign observed in these cases. In one-fourth of the fifty-two cases reported by W. Gilman Thompson ocular edema was noted. Four of the six patients whose histories were reported by F. J. Parker complained of this ocular symptom. In fourteen cases studied by R. Fuchs ocular edema was the predominating sign. Alexander, Garland, Heisen, Grove, Gruber, Bettison, Karpeles, Weiss, and Groenouw in their reports of numerous cases, both epidemic and sporadic, have shown that ocular edema is the characteristic symptom of the disease. This observation is emphasized here for the purpose of pointing out the clinical significance of this physical sign, for since it is an early symptom of the disease, many of these cases consult first the ophthalmologist, and therefore the responsibility for an early diagnosis may be placed upon him. It is recognized, of course, that the final diagnosis can be made only after a differential white count and confirmed by finding the parasite in the muscle section.

Variation in the visual acuity of this man during the course of the disease may suggest a retrobulbar neuritis, toxic in character, or perhaps a similar action upon the retinal elements, since

paralysis of accommodation was excluded and the error of refraction found to be insignificant. This observation is interesting when compared with a case in which there was an optic neuritis with retinal hemorrhages, reported by W. Gilman Thompson. In another severe case Thompson noted that the vision was temporarily affected; the cause was not determined. On the other hand, it seems reasonable to believe that interference with accommodation, if present from toxic action, would be a transient and variable effect during the course of such a disease and therefore would account for variations in the visual acuity. However, when tested, this patient showed no loss of accommodation, and the error of refraction, + 0.50 sphere in each eye, could not reduce the vision to 20/40 or 20/30 unless ciliary paralysis was complete. Yet it must be understood that this man was very sick, and to observe him was to recognize that the disease was capable of producing at least transient changes either in the retina, the optic nerve, or the ciliary mechanism of the eye.

In this connection it is interesting and perhaps instructive to note the marked degree of involvement of the extrinsic ocular muscles by the larvæ of the parasite as shown in the photomicrographs here presented (figs. 3 and 4). One glance at the presence of twelve encysted larvæ in the microscopic field shown in these illustrations is sufficient to emphasize this and to allow one to conceive of the numerical host of these worms which must have crowded the extrinsic ocular muscles in those cases severe enough to produce exophthalmos. Is it not reasonable, then, to believe that this orbital pathology in the presence of exophthalmos may have given rise to a retrobulbar involvement—mechanical or toxic (or both) in origin—sufficient to cause transient variations in the acuity of vision during the height of the parasitic invasion?

Further evidence, but only indicative of this deduction, is found in the histologic sections of the optic nerve in

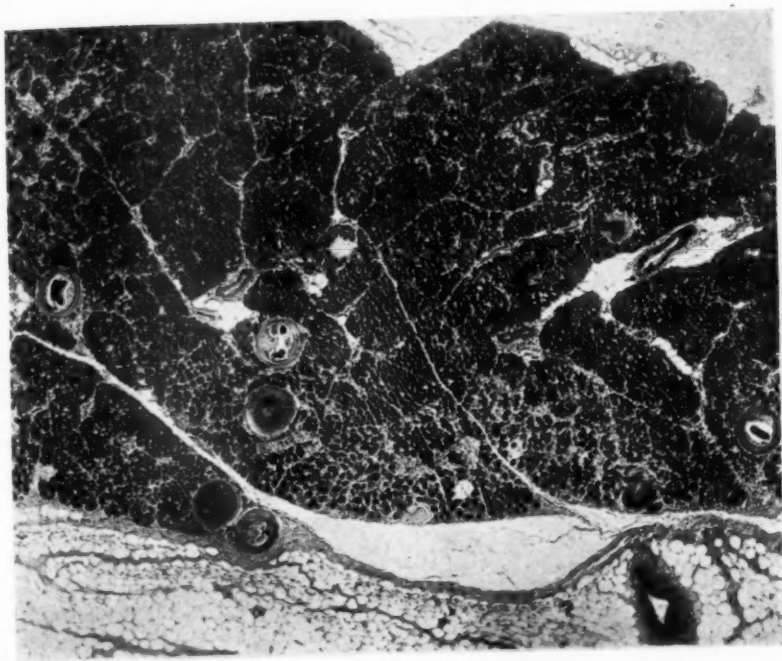


Fig. 3 (Key). Larvae of trichinae in extrinsic ocular muscle. (Wintersteiner's collection, Dr. Samuels.)

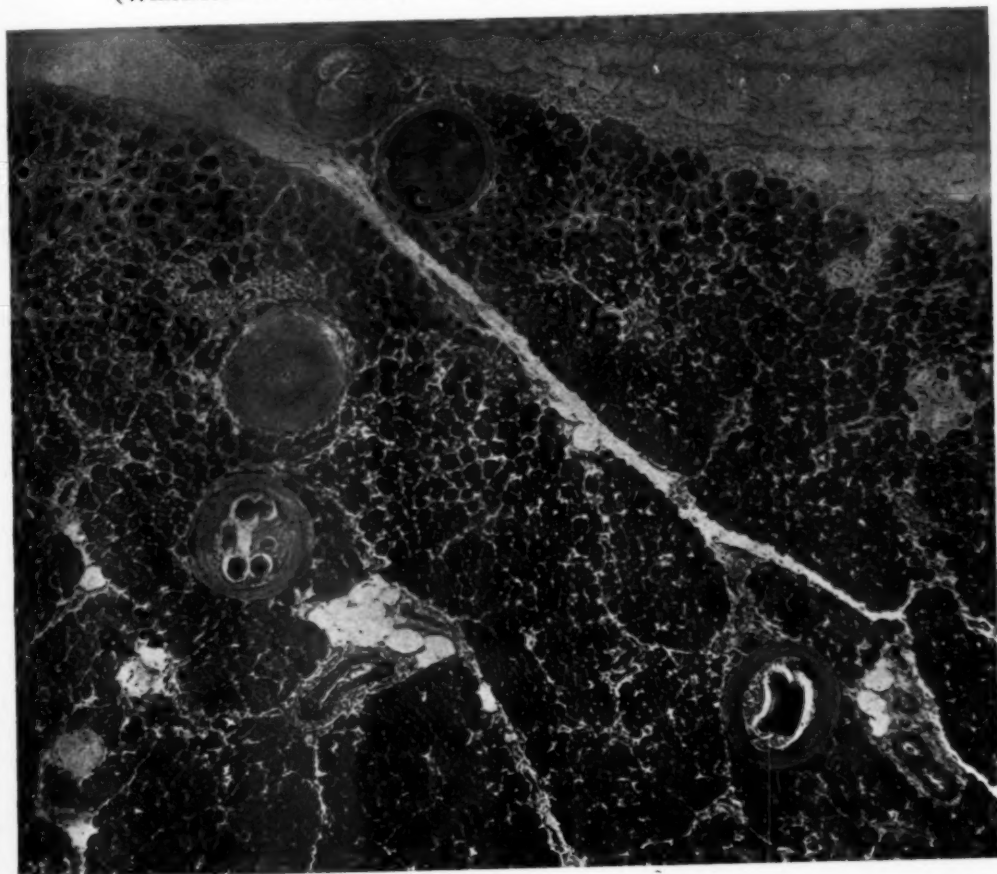


Fig. 4 (Key). Larvae of trichinae in extrinsic ocular muscle. (Wintersteiner's collection, Dr. Samuels.)

these cases, photomicrographs of which are shown in the figures 5 and 6. In these one notes the marked separation of the dural and arachnoid sheaths from the clinging pial covering of the nerve bundles, an observation which may have no significance whatever if due to the effect of the fixing agent. But the apparent slight thickening and ragged appearance of the pial sheath together with the suggestion of inflammatory exudate in the subarachnoid space lends noteworthy evidence that a retrobulbar involvement may have been present here.

Serial sections of the nerve would have revealed, perhaps, more definite indications adverse to or in favor of this theory. Unfortunately these were not available. The nerve fibers, neuroglial tissue, and supporting connective tissue of the nerve itself, in the several sections studied, appeared to be normal in every detail. This histologic picture, then, to say the least is suggestive, and together with clinical reports of other cases, the recognition of the pathology of the orbit in cases of exophthalmos, and the profound toxic state of the patient, lends evidence that a retrobulbar neuritis may account for the variation in visual acuity in severe attacks of trichinosis.

The blind spots should have been studied and the search for scotoma made in order to corroborate if possible this supposition, but at the height of the attack the necessity for this important additional check upon the causal relation did not occur to the writer. When the variations in visual acuity were recognized as possibly due to a retrobulbar neuritis, the time for making such observations had passed. This explanation is given as a suggestion to those who may in the future observe similar cases of exophthalmos in trichinosis.

It is well known that the severity of the attack, and so the violence of its course, is dependent upon the number of larvæ ingested at one time and whether consecutive infections of a smaller number of parasites have occurred. The history of this case

was, therefore, consistent with the severity of the attack, and the course of the disease was typical, as the periods of ingression, digestion, and regression, so well-defined by Rupprecht, were observed. The severity of the attack was made evident by the high fever, the high eosinophilia, the patient's profound weakness, and the prominence of his ocular symptoms.

The blood count made at intervals of four days during the disease was an interesting expression of the character of the infection. The hemoglobin was reduced to seventy-five per cent during the period of regression, at which time the red count dropped slightly to 4,500,000. At the height of the attack (beginning of the period of digression) the white count reached 27,000, after which in four days it dropped to 10,000. At the height of the attack the small lymphocytes were reduced to three per cent, and they returned to thirty-four per cent eight days later. The polymorphonuclears were reduced from twenty-six per cent in the beginning of the attack to fourteen per cent in the period of digression, later returning to forty-one per cent. The eosinophilia was noted first at sixty-nine per cent, increasing to seventy-four per cent at the height of the attack, later dropping to thirty per cent when the last count was made. It is unfortunate that subsequent blood counts could not have been made, but the patient refused further investigation after leaving the hospital.

As for the differential diagnosis of sporadic cases of trichinosis, the disease has been confused with cholera, typhoid fever, influenza, rheumatism, and acute polymyositis. In recent years it has been more commonly mistaken for paranasal sinusitis (Thomas, Pratt, Thompson).

Except for catharsis, calomel, castor oil, and colonic irrigations, the treatment of trichinosis has been recognized as being more or less symptomatic. Thymol, either by mouth, or

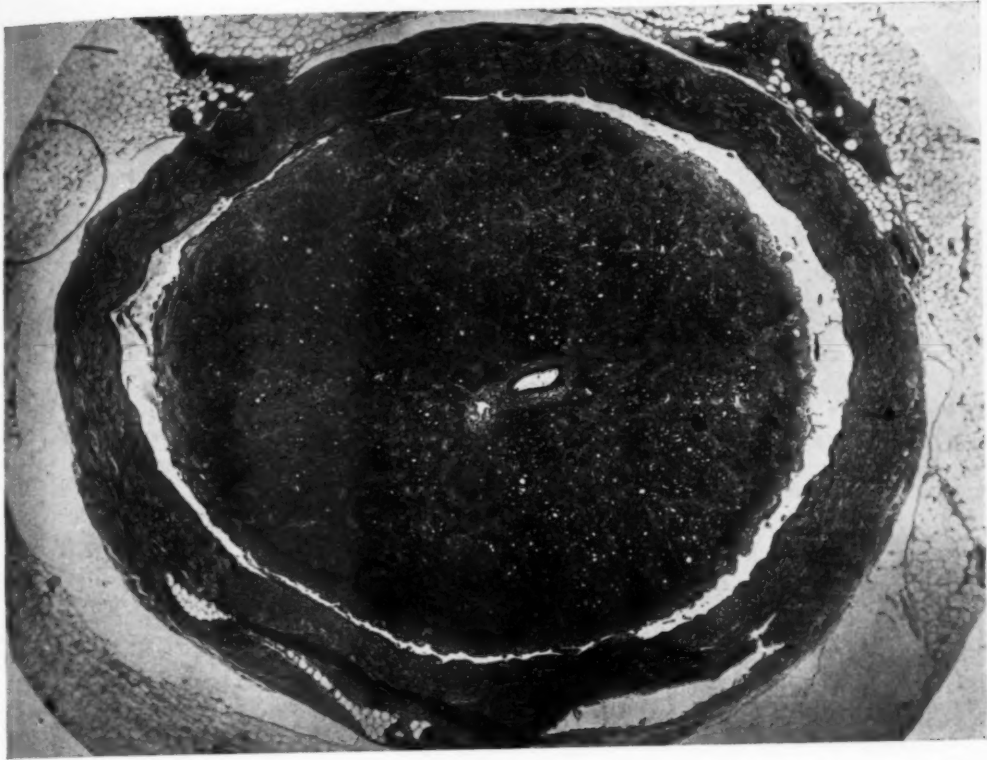


Fig. 5 (Key). Optic nerve in trichinosis. (Wintersteiner's collection, Dr. Samuels.)

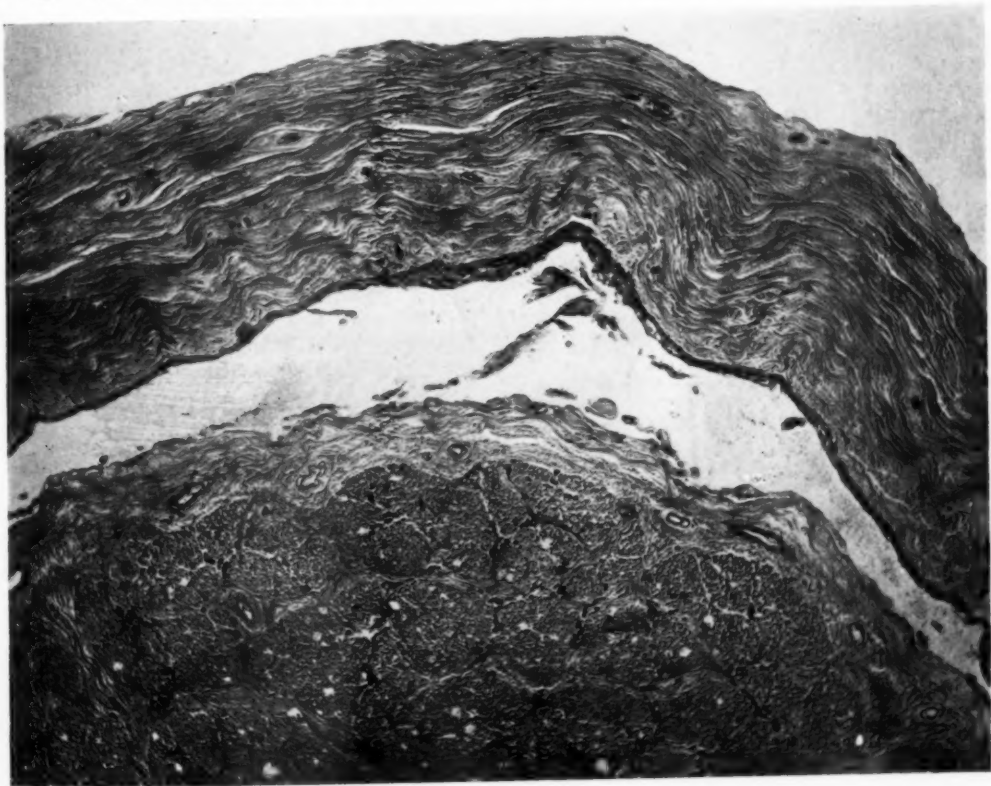


Fig. 6 (Key). Optic nerve sheaths in trichinosis. (Wintersteiner's collection, Dr. Samuels.)

by intramuscular injections (gr.1 in sterile olive oil), has been employed extensively in the disease. The serum of animals that have had trichinosis has been used (Alexander) but without any appreciable effect upon the symptoms or duration of the disease. Intravenous injections of antimony and potassium tartrate (tartar emetic) during the stage when the trichinae are in the blood have been recommended by Grove.

In recent years salvarsan has been advocated as a useful agent in these cases, but with varying results as reported by different authors. It seems quite obvious that the effectiveness of any treatment employed would depend upon the stage of the disease in which the treatment was administered. In this case report it would appear that the neosalvarsan injections had been definitely beneficial. Prophylactic measures to pre-

vent spreading of the disease are well known; the one of most importance to the clinician is the requirement that the case be reported to the city board of health as soon as the diagnosis is made, for the purpose of investigating the source and distribution of the infected pork.

I wish to thank Mr. Edward Burchell of the Eno Laboratory of the New York Eye and Ear Infirmary for his cooperation in the study of this case. I am sure he shared with me the interest and fascination that were experienced in making the laboratory investigation and in following the clinical course of the disease. To Dr. Bernard Samuels I am indebted for the microscopic slides of the encysted larvæ of the parasite in the ocular muscles, which he had secured from Wintersteiner's collection.

100 West Fifty-ninth street.

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THE OPTICAL CORRECTION OF CONICAL CORNEA WITH THE CONTACT GLASS

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The literature relating to special optical procedures for the correction of conical cornea is reviewed. The ground contact glass, first introduced in 1920, is worn successfully by a number of victims of this defect. The simple apparatus devised by the author makes it entirely practicable for the patient to apply the contact glass himself, accurately, quickly, and with avoidance of air bubbles between the glass and the cornea. Read before the American Academy of Ophthalmology and Otolaryngology, October 15 to 19, 1928.

The first departure from the ordinary spherocylindric combinations in the optical correction of conical cornea was advocated in 1879 by Rähmann¹, who used lenses of a hyperbolic curve. It should be noted that Krämer², as recently as 1924, reported ten cases in which a very satisfactory improvement in vision was effected by the use of these lenses. Krämer, however, stated in the same paper that perhaps the best optical effect was obtained with the hydrodiascope of Lohnstein³, and that the contact glass was but very little inferior. With the hyperbolic lens the field of vision is very narrow, and only when the apex of the lens is aligned with the apex of the corneal cone is it of value. Obviously, this alignment obtains in only one position of the eye, therefore the usefulness of the hyperbolic lens is limited. The hydrodiascope, although optically efficient, is difficult of adjustment, and the appearance of the apparatus is such that its use would be confined to the private life of the patient.

The contact glass for the optical correction of keratoconus was devised by Fick⁴ in 1888 and was improved by Sulzer⁵ a year or two later. The glass of these early investigators was properly called a contact glass, in the strict sense of the term, because the thin shell of clear glass was placed on the corneal surface with only a thin film of fluid intervening. In its peripheral portion this glass rested on the peripheral portion of the cornea. This feature presented a serious obstacle to Fick in the furtherance of

his work, because his patients were unable to withstand for more than a few minutes the intense irritation of the cornea. As A. Siegrist⁶ explained some years later, the two pioneer workers in this field, Fick and Sulzer, were more interested in experimentation for visual acuity with the contact glass than they were with its clinical applicability.

The first contact glasses which were subjected to prolonged clinical use, and which aroused more widespread theoretic and clinical investigation, were made by Mueller⁷ of Wiesbaden. The Mueller device was made of blown glass. It consisted of a thin shell resembling an ordinary prothesis. This was an improvement over the Fick glass, in that a flange was added which was designed to fit the sclera. The flange formed a base which supported the corneal segment and raised it from direct contact with the cornea. This improvement enabled the glass to be worn comfortably.

It was soon learned, however, that no two corneal segments of the Mueller glass were mathematically accurate, and moreover they were often decidedly imperfect, showing high astigmatic errors. It was found to be technically impossible to blow a perfect spherical surface with accuracy. Because of these imperfections, a suitable glass in a given case was obtained empirically, simply by the trying on of a large number of glasses. This was an arduous task for the physician and a trying one for the patient, only to be repeated in

case a replacement was required. Attempts to grind the blown glasses to a uniform curvature were unsuccessful. In one such endeavor, two hundred shells were broken one after another in an attempt at grinding. Nevertheless, in spite of the obstacles encountered, a number of very gratifying results in improvement of visual acuity were obtained by the aid of the Mueller blown contact shells (Lauber⁸, Quirin⁹, Scheffels¹⁰, Siegrist¹¹, G. Weill¹², Clausen¹³, Stock¹⁴).

In 1920, at Heidelberg, Stock¹⁵ first showed ground contact glasses as made by the firm of Zeiss (Jena). This shell had the scleral and corneal contour of the anterior two-fifths of the globe. The corneal segment, bulging forward, formed a corneal chamber. The corneal segments of the glass were made in three diameters, 13 mm., 12.5 mm., and 12 mm. The height of the corneal segments was 4 mm., 4.5 mm., and 3 mm. respectively. The shell was very thin and light, and more nearly approached the ideal specifications for a suitable contact glass than any made up to that time. Contact glasses of practically these specifications are to be had at the present time. Corneal curvatures of a radius of 6.5 mm., 7.1 mm., 8.1 mm., and 9.0 mm. are available.

Dohme¹⁶ formulated the following qualifications for an ideal contact glass: (1) A perfect corneal curvature is essential; (2) the availability of a ground-in correction of proper strength (this however, is not an absolute necessity, because a shell without a ground-in correction may be supplemented with a spherocylindric spectacle correction of the usual type); (3) the contact glass should be graduated according to a definite scale; (4) an accurate fit to the sclera is necessary, so that no displacement will occur on movement of the lids; and, (5) the shell must not be affected by the tears and must not be noticeable to the casual observer. These desiderata the ground contact glass now fulfills very satisfactorily.

There are, however, other con-

siderations in the practical use of the glass which must be taken into account. That a glass must be worn without irritation is paramount. In this regard, all possible variations and individual tolerances are reported. For example, cases are on record where seamstresses, teachers, technicians and public clerks have worn contact glasses a full working day, month after month and year after year, with no symptoms of distress. On the other hand, it is reported that some patients have tolerated a contact glass in one eye while the fellow eye was absolutely intolerant. The general opinion is that in a short time tolerance is established to the point where the wearing of the glass may be accomplished for several hours daily. In the writer's experience, however, it is of the first importance to select at the outset a shell of sufficient corneal height to prevent any possibility of corneal contact. I feel confident that, if this precaution is adhered to, any patient with a little determination can wear a contact glass successfully. The final problem to be solved in the successful use of the contact glass is the placement of the shell in position by the patient.

My first difficulty encountered with the case which I wish to report was that of placement of the shells. It must be understood that, if the desired optical effect is to be obtained, the corneal chamber of the contact glass must be adjusted in position immediately over the cornea, with a sufficient amount of physiologic salt solution between the posterior surface of the glass and the corneal surface of the eye to completely fill the space. Only when this condition obtains have we substituted for the irregular and strongly refractive conus a regular and much weaker refractive surface. After a few trials, in which instillation of a one-half per cent solution of holocain in the conjunctival sac preceded the placing of the glass, its adjustment to the eye was accomplished quite readily, but always a certain amount of salt solution was

lost in the manipulation, so that air bubbles appeared in the chamber between cornea and glass. It was necessary to get rid of these by a rather awkward procedure of introducing salt solution into the chamber between the edge of the glass and the adjacent sclera. Again, it was necessary for the patient to come to Denver from a near-by town in order to have the contact glasses applied. These were undesirable features, if the glasses were to be used by the

and of small diameter is fitted at one end with a rubber cork. The opposite end is fitted with a piece of rubber gas tube an inch and a half long and fifteen millimeters in diameter. The free end of this tube is cupped out so that it may receive the convex surface of the contact glass, and over the free end of the tube is stretched a gum-rubber finger cot. A small pin-point perforation is made in the finger cot at its center. The rubber cork is inserted into the bottle.

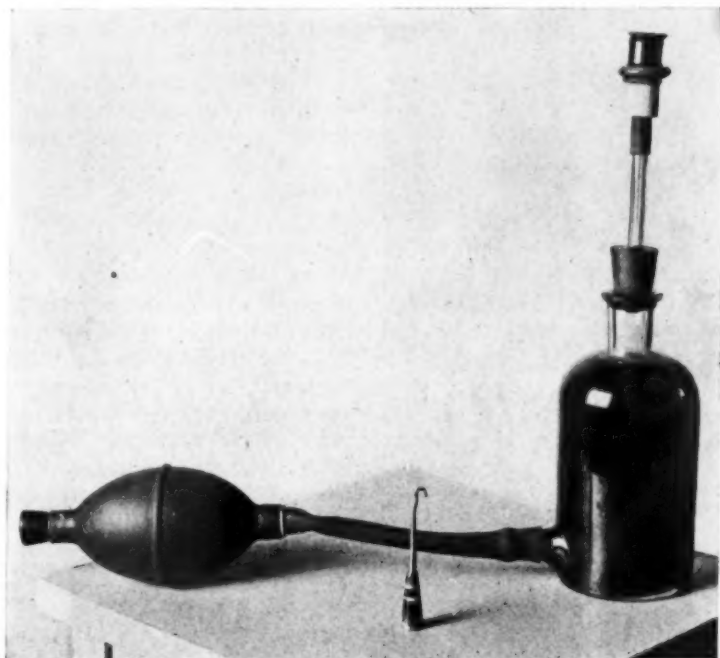


Fig. 1 (O'Rourke). Apparatus for applying contact glass to eyeball.

patient with any degree of satisfaction. Consequently, a simple apparatus was devised, which has proved very satisfactory for placing the contact glass in position. This maneuver is done by the patient unassisted, accurately, quickly, and with avoidance of air bubbles. The apparatus is shown in figure 1.

To the outflow neck of a small wash bottle is attached an ordinary hand bulb. The wash bottle is filled with water up to the lower margin of the neck, thus leaving a small air space. A piece of glass tubing six inches long

Application of pressure on the bulb forces air through the pin-hole in the cot. The shell is now moistened and placed in contact with the cot, and release of pressure on the bulb causes the shell to be held firmly in position by air pressure. The concavity of the glass is filled with normal salt solution. The patient retracts his lids as shown in figure 2 and places his eye directly over the center of the shell, the sclera in contact with the flange. He then permits the retracted lids to slip over the margin of the glass. Pressure is now applied

with the hand bulb and the contact glass is released from the apparatus and remains in place on the eyeball. The removal of the glass is a simple maneuver. Any small blunt instru-

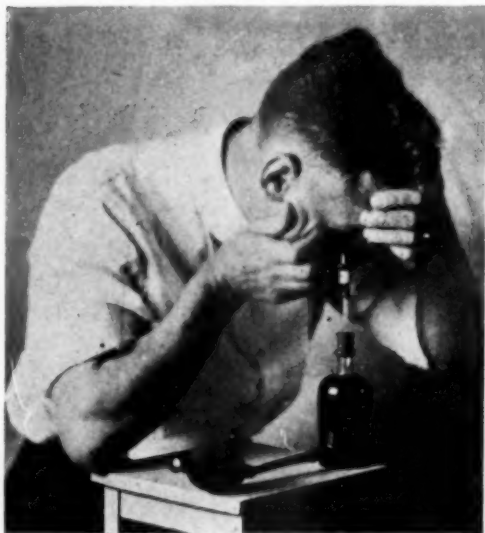


Fig. 2 (O'Rourke). Illustrating patient's position in applying contact glass.

ment, as shown in figure 1, may be inserted gently between the sclera and the glass, the lids retracted, and the shell drawn forward and out.

The case which prompted my interest in this subject was first seen by Dr. Edward Jackson in 1910. At that time the patient was nineteen years of age. He complained of poor vision in both eyes, which had begun five years previously. The vision was O.D. 4/60 and O.S. 2/150. With -15.00 sph. -8.00 cyl. ax. 20° vision was O.D. 4/30, and with -10.00 sph. -5.00 cyl. ax. 20° vision O.S. was 4/12.

In September, 1914, the correction was changed to O.D. -3.00 sph. -6.00 cyl. ax. 25° (V.=5/15) and O.S. -6.00 sph. -1.00 cyl. ax. 180° (V.=5/15). These notations were recorded with a 2 to 3 mm. pupil, with the eyes under a solution of pilocarpin gr. 3 to dr. 4, two drops

instilled three times daily. The correction given in 1914 was worn about six months, and not until 1923 were glasses worn again. At this time a three centrad prism base up O.D. and a two centrad prism base down O.S. were prescribed. These prisms alleviated an annoying horizontal aberration. Vision O.D. with a 1.5 mm. pupil and the prismatic correction was 6/24, and vision O.S. 6/18.

In April, 1927, when the patient first came under my observation, vision O.D. was 6/30 and O.S. 2/60. This vision was with the prismatic correction only, which he had worn constantly since 1923. A contact glass with a radius of curvature of 7.1 mm. was applied to each eye, improving the vision to 6/12 and 6/20 respectively. Since this time the contact glasses have been worn daily. The patient reads ordinary print comfortably. He conducts his high school classes in mathematics with a great deal more satisfaction, and for the first time in years recognizes faces distinctly. In short his possibilities in life have been markedly improved.

A consideration of the above visual notations gives some slight conception of the extreme variation in visual acuity resulting from conical cornea. An inadequate conception, however, is conveyed as to the actual effect upon the general visual impressions of my patient produced by the application of the contact glasses. In an effort to make his impression known to you, I quote from him directly: "The contact glasses sweep away nearly all of the harassing blur that has been before me for years. The thrill of seeing clearly objects for so long seen only indistinctly—the clear cut line of type, the distant horizon, the intervening valley in all its beautiful detail—is something that I never expected to experience again in this life."

217 Imperial building.

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HYPEROPIC UNDERCORRECTION DUE TO RETINOSCOPY

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Under cycloplegia, it is a common practice to consider the retinoscopic measurement of the refractive error as entirely reliable, especially as regards the spherical correction. But cycloplegia is frequently incomplete, and by resort to fogging (notwithstanding the cycloplegia) the patient will often be found to accept more plus sphere or less minus sphere than was indicated by retinoscopy.

It is generally conceded that retinoscopy, in conjunction with a cycloplegic, is the most accurate means of refraction at our disposal. The chief advantages are that it is an objective test, most helpful with children and with other noncooperative patients, and that it gives the total refractive error, without which we can not be sure of the prescription in cases of strabismus following a refractive error, and in cases of spasm of accommodation. The test itself is very simple, but, unless the management of each case proceed in a logical manner without short cuts, the result is often disappointing.

Attention is called to a common short cut which often defeats the purpose of the test, viz., the arbitrary addition of $-1.D.$ sphere to the neutralizing lens as found by retinoscopy at one meter in the dark room.

When the two principal meridians of the patient's eye are neutralized in the dark room by the interposition of suitable lenses, the shadow moves neither "with" nor "against". This means that the rays of light emerging from the patient's eye are brought to a focus at the observer's eye, and also, by the law of conjugate foci, rays of light starting from a point at

the observer's eye will be brought to a focus upon the patient's retina. Thus the dark-room neutralizing lenses correct the patient's error for the distance at which the observer is standing, usually one meter.

The cycloplegic objective test, or retinoscopy, should whenever possible be followed by a cycloplegic subjective test at the trial case. This is a modification of the dark room findings, with the patient's cooperation, to determine the total error for distance, or parallel rays.

If a $+1.D.$ sphere is placed in the path of parallel rays, it will bring them to a focus at one meter distance and conversely a minus diopter sphere will render parallel the rays of light which were previously converging to a focus at one meter. Since the patient is already corrected for one meter it is seen that he is wearing $+1.D.$ too much for parallel rays, and, in order to permit him to focus these rays upon the retina, we must subtract one diopter from his dark room findings, or add $-1.D.$ But to do so immediately without further corroboration is an unwarranted assumption that the retinoscopy has been exact.

In the first place, perfect cycloplegia is the exception rather than the

rule, and as long as any accommodation remains the retinoscopy cannot be perfectly correct. Again, unless the observer stand at exactly one meter distance from the patient, he is not justified in adding exactly $-1.D.$ to the dark room findings. But the greatest source of error is in the retinoscopy itself. However proficient one may become in shadowing, small errors creep in from time to time, and frequently one is confronted with an elusive shadow that baffles the most careful observation.

When the cycloplegic test at the trial case is conducted in a careful and logical manner, it affords a valuable check upon the dark room findings and prevents undercorrection of the hyperopic cases and overcorrection of the myopic ones, such as must inevitably occur if the dark room readings be too low or too high respectively, and the $-1.D.$ added automatically.

We have seen that by the dark room findings the patient is corrected for the distance of one meter or, in other words, that he is wearing $+1.D.$ sphere too much for distant vision. The distant, parallel rays are brought to a focus one diopter in front of his retina, so that he is made artificially myopic by one diopter. This is so whenever the patient is under a cycloplegic and wearing his dark room correction, regardless of whether his dark room correction be hyperopic, myopic, or mixed. Now a myope of $1.D.$ has commonly no better than 20/70 vision, so the patient with his dark room correction should not see any better than that. If he does, we know immediately that the retinoscopy was too low, if he is a hyperope, or too high, if he is myopic, so that the dark room correction does not make him a full diopter myopic. Direct addition of $-1.D.$ would then throw the focus behind his retina, forcing him to accommodate an amount equivalent to the error in retinoscopy.

On the other hand, if the minus addition is made gradually, by $-0.25D.$ at a time, there is no danger of giv-

ing too much minus at the cycloplegic subjective test, if no more minus is added after the best vision is obtained, even though only $-0.50D.$ has been added to the dark room findings. The purpose of this test is to determine the total error of refraction, i.e., the highest amount of plus or the lowest amount of minus consistent with the patient's best distant vision. Too little plus or too much minus will often allow the patient his best vision, but, because it forces the accommodation to play a part, however small, it is defeating the purpose of the test.

For example: If the retinoscopy in each principal meridian is $+4.$, a $+4.D.$ sphere should correct the patient's error for one meter and $+3.D.$ should fully correct the error for infinity or "distance." Instead of adding the $-1.D.$ directly to the dark room findings, let us see what happens when we proceed slowly. The patient, seated before the test chart at twenty feet, is asked to read the smallest letter possible with the dark room finding before one eye, $+4.D.$ The other eye is covered. If the retinoscopy has been exactly correct, his vision will usually be no better than 20/70. When the sphere is reduced to $+3.75D.$, the vision will be improved to approximately 20/50. With $+3.50D.$ the vision is approximately 20/40, and with $+3.25D.$ about 20/30, and with $+3.D.$ it is 20/20 or better.* Although $+2.75D.$ would still give the maximum vision, it would force the accommodation into play and would therefore be incorrect.

On the other hand, if the patient's vision with $+4D.$ is better than 20/70, say 20/50, we may conclude immediately that the $+4$ retinoscopy was not high enough. In this case, $+3.25D.$ or more* will probably give 20/20, and, although $+3D.$ may give the same vision, it will not represent the full cycloplegic error for distance, the extra $-0.25D.$ over the lens which first gave 20/20 vision being overcome by accommodation, despite the cycloplegic.

If the retinoscopy shows $-1.$ in the vertical and -0.50 in the horizontal, $-0.50D.$ sph. with -0.50 cyl. ax. 180° should theoretically correct the patient for one meter and give him only 20/70 for distance, and the best distance vision should be brought out fully with $-1.50D.$ sph. with -0.50 cyl. 180° .* Any more minus than that only calls upon the accommodation. Better than 20/70 with the dark room formula nearly always denotes too much minus or too little plus in the retinoscopic findings, and indicates that less than $-1.D.$ needs to be added for the distance correction. More minus should never be added after the patient has first reached his best visual record with the test type.

*A further modification is actually necessary because we have assumed that rays of light coming from a point at a distance of twenty feet or six meters are parallel. As a matter of fact, because they are coming from a finite distance, they diverge slightly.

Since $+1/6D.$ is necessary to focus parallel rays at a distance of six meters, then by definition that same amount is required, by the law of conjugate foci, to render parallel those rays emanating from a point at a distance of six meters. That is to say: when the patient is fully corrected at the trial case for the distance of twenty feet or six meters, he is overcorrected by $+1/6D.$ (or undercorrected by $-1/6D.$, as the case may be) for parallel rays and would be blurred by that amount were he to wear the full correction found at the trial case.

When the test chart is at six meters the patient's full correction requires to be modified by $1/6D.$, at five meters by $1/5D.$, and so on, for distance. Since the trial case lens nearest above $1/6D.$ or $1/5D.$ is $1/4D.$, this is usually subtracted. For example: If the patient's vision were 20/20 with $+3D.$, his distance correction would be more nearly $+2.75D.$ Or, if 20/20 were obtained with -1.50 sph. combined with $-.50$ cyl. ax. 180° , the distance correction would be nearer -1.75 sph. combined with $-.50$ cyl. ax. 180° .

This modification is usually made after the postcycloplegic test, but must always be borne in mind when computing the full distance correction, since the test-chart is always at less than infinity distance.

The immediate addition of $-1.D.$ to the dark room findings does not take into consideration any possible error in retinoscopy, and often presses accommodation into service, contrary to the purpose of the cycloplegic test, whereas the gradual and careful addition of as much of the $-1.D.$ as proves necessary gives an accurate check upon the retinoscopy and prevents the addition of too much minus with its demand upon accommodation.

The cylinder may be checked as to strength and axis according to individual preference.

Whenever possible, the patient should again be examined at the trial case after the cycloplegic has worn off. At this postcycloplegic test, allowance is to be made for the normal tonus of the ciliary muscle, which will often reduce the amount of plus sphere accepted in the hyperopic cases. In the myopic cases, the return to a small pupil, with elimination of the aberrant peripheral rays, may also demand a modification of the lens accepted under the cycloplegic. Cylinders, especially high ones worn for the first time, usually have to be cut down to the point of comfortable toleration. Finally, the near point must be checked to determine what additional plus sphere, if any, is necessary to give a good range for close work.

In the hands of a good refractionist, the majority of patients may be examined successfully without the use of a cycloplegic, but there are certain cases which demand a knowledge of the total error, e.g., in noncooperative patients, strabismus, and in spasm of accommodation. Obviously, the first class will not lend itself to a cycloplegic subjective test. In the last two, however, the full error must be determined in order to write an intelligent prescription.

40 East Sixty-first street.

A SCOTOMA ASSOCIATED WITH STRABISMUS

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After carefully excluding cases which for various reasons were not entirely reliable, a series of cases of strabismus were found to show an absolute central scotoma in the amblyopic eye. The Lloyd stereo-campimeter was used for the visual field tests (obtaining fixation with the better eye), with a special test object. Visual acuity in the neighborhood of 6/22 was typical of these amblyopic eyes.

The reduced vision was satisfactorily explained by the scotoma, as were also the "wandering movements" of the amblyopic eye. The central scotoma of strabismus was found to be connected to the blind spot by an angioscotoma.

The defective vision often met with in monocular internal strabismus has long presented a problem of many complexities. The question whether a scotoma exists or whether the decrease is more in the nature of a general retinal depression* has furnished material for endless speculation.

The literature is not barren of interest in the scotoma of strabismus, but past endeavor has been greatly handicapped by lack of knowledge of other conditions giving rise to similar defects. Moreover, the earlier workers did not have the advantage of such modern instruments as the slit-lamp, the electric ophthalmoscope, and the stereo-campimeter.** Newer concepts of embryology, anatomy, and physiology have likewise made such an investigation more promising and fruitful.

The demonstration of a scotoma with a study of its features represents but one unit of the symptom complex of strabismus. Even at this late date we are unable to define accurately just what the term strabismus includes. It is necessary to state in detail the limits of the present study.

The first step therefore deals with a tabulation of the material.

The source of material

A.—Gross material was

* Heine¹ gives Schmidt-Rimpler credit for this idea.

** The accuracy of modern instruments which have made recent progress so rapid has been pointed out in a paper by Peter. He makes particular reference to the scotoma of amblyopia ex anopsia. He places his subjects in a group of "acquired amblyopia", so that his study is not comparable with the present one.³

- (a) 100 cases from private practice
- (b) all ages
- (c) all types, forms and stages of strabismus
- (d) 40 were internal strabismus
- (e) 34 of the 40 mapped were apparently appropriate

B.—Finally selected material (from the above 34, 16 were finally selected and represented):

- (a) monocular internal strabismus
- (b) cosmetic parallelism
- (c) monocular amblyopia
- (d) opposite eye correcting to normal vision
- (e) family history of one or more squinters
- (f) personal history or evidence of having squinted
- (g) satisfactory cooperation for all tests. (Blind spots and vessel stumps checked on unaffected eye first)
- (h) neglected early care. (No case had had care or worn glasses under nine years of age)

C. Material eliminated was as follows:

Any case giving history or evidence of

- (a) ocular traumatism—accidental or operative. Birth injuries of insignificant proportions, a suggested cause of amblyopia, could not be ruled out. Some authors think the traumatism of operation may cause a scotoma.)

- (b) ocular disease or congenital defect
- (c) myopia of either eye
- (d) more than 2 D. of astigmatism
- (e) true nystagmus
- (f) external strabismus
- (g) alternating strabismus
- (h) systemic lues or tuberculosis. (Blood Wassermann was not taken routinely nor were complete physical examinations made)
- (i) nasal sinusitis, severe intoxications. (No case had a history of sinus blindness or severe sinusitis)

Technique used in mapping the scotoma

1. The Lloyd stereo-campimeter was used.
2. The binocular method was employed (except as otherwise indicated in the table).
3. No attempt was made to correct muscular imbalance.
4. No correcting lens was worn during the test. (The instrument contains lenses which focus at the distance of the chart, 190 mm.)*
5. The unaffected eye was used for fixation except where indicated.
6. The fixing eye was provided with a green filter.
7. The affected eye was provided with a red filter, matched in brightness to the green.
8. The fixation point was surrounded by a circle so as to encourage fixation.
9. Fifteen foot-candles of "artificial daylight" illumination were used. (The source of light was an especially designed illuminator attached directly to the stereo-campimeter).
10. The objects used were small caliber silver wires, fused at the end into 1 mm. spheres and whitened with hydrochloric

* This is a great advantage in all types of delicate mapping, as it avoids the fatigue of prolonged accommodation for short range.

acid. The stems were blackened and mounted in black paper handles (described by the writer in another paper⁴)*.

11. Mapping in each instance was from seeing to blind area and at right angles to the supposed border of the scotomatous area.
12. The black charts with gray diagram were used for direct mapping.
13. All cases were carefully examined before plottings were made. This included
 - (a) dynamic and static refraction of each eye
 - (b) slit-lamp examination of media, etc.
 - (c) peripheral field study with 0.5° white object, Schweigger perimeter under 15 foot candles artificial illumination.
 - (d) color vision tested, using Stillings' plates
 - (e) visual acuity measured by the use of white test letters on a black background (letters as suggested by the committee on standardizing test cards of section on ophthalmology of the American Medical Association, 1917⁵)

The characteristics of the scotomata as derived from the material of this series, by means of the technique outlined, are best understood by reference to the accompanying charts and tables.

Analysis of the scotoma table

In this series it is to be noted that the unaffected eye was used for fixation while its fellow was being mapped. This was of course made possible by the use of the Lloyd stereo-campimeter (see exceptions in notes).

All these patients showed cosmetic parallelism, though but one had been

* This combination of 1 mm. objects and the particular shade of red filter used equals 0.25 mm. white sphere without the red glass and gives the same results.

Table 1
Tabulation of accepted cases.

No.	Case	Age	Sex	Onset age	Eye affected	Uncorrected acuity	Corrected acuity	Degree of excentric fixation (horizontally)	Size of scotoma (degrees) Vertical Horizontal	Others in family known to be affected with strabismus
1	P.H.	17	M	3	O.S.	6/60, w. +1.50s.	$\frac{6}{20} + 1$	centric	3° by 3°	Brothers, sister, aunt
2	M.H.	12	F	3	O.S.	3/60, w. +1.50s.	$90 = \frac{6}{15}$	centric	3.5° by 3°	Brothers, sister, aunt
3	L.H.	14	M	3	O.S.	6/30, w. +1.00s.	$\frac{6}{15}$	centric	2° by 2°	Brothers, sister, aunt
4	J.F.	50	F	very young	O.S.	2/60, w. +3.00s.	$\frac{6}{15}$	centric	1° by 1°	Mother
5	E.C.	14	M	3	O.D.	3/60, w. +6.50s.	$\frac{6}{20}$	centric	2° by 3°	Uncle
6	J.B.	30	M	3	O.S.	3/60, w. +1.50s.	$\frac{6}{15}$	1.5° centric	1° by 1°	Brother
7	A.M.	22	F	very young	O.S.	6/60, w. +1.50s.	$\frac{6}{20}$	centric	1° by 1°	Aunt
8	M.B.	9	F	3	O.S.	6/15, w. +2.00s.	$\frac{90}{60} = \frac{6}{15}$	centric	1.5° by 2°	Grandfather
9	E.A.	35	F	1	O.S.	6/60, w. +5.00s.	$\frac{6}{20}$	varying	2° by 3°	Aunt
10	W.W.	31	M	very young	O.S.	6/60, w. +3.00s.	$\frac{90}{60} = \frac{6}{20}$	varying	?	Father
11	H.Z.	21	F	very young	O.D.	6/20, w. +2.25s.	$\frac{6}{20}$	1.5°	?	Brother
12	M.G.	32	F	young	O.S.	6/20, w. +4.00s.	$\frac{6}{12} - 3$	0.5°	2° by 2.5°	Mother
13	E.R.	49	F	1	O.S.	3/60, w. +5.50s.	$\frac{6}{60} + 2$	centric	3° by 2.5°	Sister and aunt
14	H.B.	18	F	3	O.S.	6/30, w. +5.00s.	$\frac{75}{60} = \frac{6}{15}$	3°	4° by 3°	Sister and cousin
15	J.C.	43	M	2½	O.D.	3/60, w. +0.50s.	$\frac{60}{60} = \frac{6}{60}$	1°	?	Uncle
16	H.D.	12	M	3	O.S.	6/60, w. +4.00s.	$\frac{75}{60} = \frac{6}{15}$	4°	1° by 1°	Brother
Averages		25½		2½	13 O.S.	6/75	6/22		2° by 2°	

operated on (no. 9)—a simple tenotomy.

Fixation as here noted is measured by counting the small squares (one degree each) from the small inner fixation circle to the center of the scotoma. It is thus seen that eight of the sixteen maintained satisfactory central fixation under the conditions

of this examination. Two showed oscillations during the examination, while the remaining six showed excentric fixation of from 0.5 to 4 degrees in the horizontal meridian.

As regards the size of the scotomata, only those maintaining steady fixation can be considered, and it seems reasonable to include those in

Table 2

Comparison of right and left eye of each accepted case.

(Table II is inserted merely to supply the data on the unaffected eye which are necessary in demonstrating the monocular nature of the affection).

No.	Name	Vision	Uncorrected acuity	Corrected acuity
1	P.H.	O.D. O.S.	6/15, w.+1.50s. 6/60, w.+1.50s.	= 6/4 = 6/20+1
2	M.H.	O.D. O.S.	6/20, w.+2.50s. 3/60, w.+1.50s.+1.00c. ax.	= 6/6 90° = 6/15
3	L.H.	O.D. O.S.	6/15, +0.50c. ax. 180° 6/30, w.+1.00s.	= 6/4 = 6/15
4	J.F.	O.D. O.S.	3/20, w.+2.00s.+0.50c. ax. 2/60, w.+3.00s.+1.00c. ax.	90° = 6/6 120° = 6/15
5	E.C.	O.D. O.S.	3/60, w.+6.50s. 6/60, w.+5.50s.	= 6/20 = 6/6+3
6	J.B.	O.D. O.S.	6/15, w.+1.00s.+0.75c. ax. 3/60, w.+1.50s.+2.00c. ax.	120° = 6/6 65° = 6/15
7	A.M.	O.D. O.S.	6/6, w.+1.25s. 6/60, w.+1.50s.	= 6/4 = 6/20
8	M.McB.	O.D. O.S.	6/12, w.+1.25s.+0.50c. ax. 6/15, w.+2.00s.+0.75c. ax.	90° = 6/4 90° = 6/15
9	E.A.	O.D. O.S.	6/30, w.+3.75s.+1.50c. ax. 6/60, w.+5.00s.	180° = 6/4 = 6/20
10	W.W.	O.D. O.S.	6/60, w.+2.25s.+0.50c. ax. 6/60, w.+3.00s.+0.50c. ax.	90° = 6/6 90° = 6/20
11	H.Z.	O.D. O.S.	6/20, w.+2.25s. 6/7, w.+0.75s.	= 6/20 = 6/4
12	M.G.	O.D. O.S.	6/20, w.+4.00s.+0.50c. ax. 6/20, w.+4.00s.	90° = 6/4 = 6/12-3
13	E.R.	O.D. O.S.	6/30, w.+5.00s.+0.50c. ax. 3/60, w.+5.50s.	180° = 6/6 = 6/60+2
14	H.B.	O.D. O.S.	6/60, w.+5.75s.+1.50c. ax. 6/30, w.+5.00s.+2.00c. ax.	90° = 6/4 75° = 6/15
15	J.C.	O.D. O.S.	3/60, w.+0.50s.+1.00c. ax. 6/15, w.+1.00s.+2.00c. ax.	60° = 6/60 135° = 6/4
16	H.D.	O.D. O.S.	6/30, w.+4.00s.+1.50c. ax. 6/60, w.+4.00s.+2.00c. ax.	105° = 6/6 75° = 6/15

whom fixation was excentric as long as it was steady. It therefore appears that the average of these measurable scotomata covered about two degrees of the field in both the vertical and the horizontal meridians, or we may say a circle of one degree radius.

The subjects of this study were all born in the United States of America, and with the exception of

number eleven, H.Z., their parents were American born.

The average age at the time of this study was twenty-five and a half years, the youngest being nine, the oldest fifty years.

Of the sixteen cases here tabulated, seven were male and nine were female.

The family histories showed that some member of the immediate family

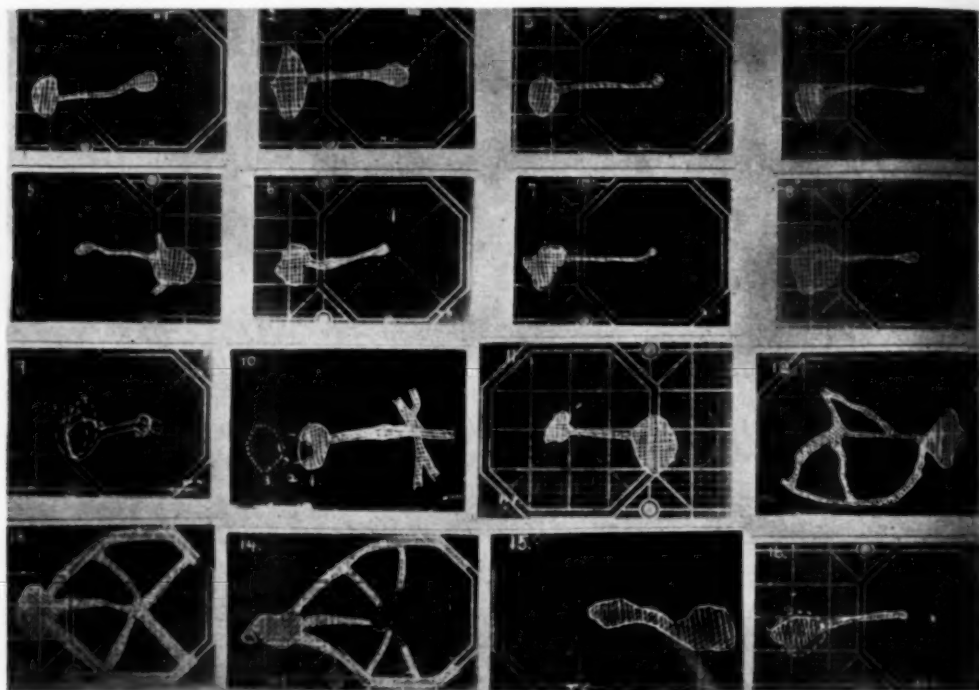


Plate no. 1, figs. 1 to 16 (Evans).

Nos. 1, 2, and 3. Two brothers and sister; note similarity of data in each instance.

Nos. 1 to 7 inclusive offer the best opportunity for accurate measurement, though 13, 14 and 16 are reliable.

No. 9 illustrates the necessity for mapping some of these cases rather fast. Slow mapping would have shown a much larger and deformed blind spot and scotoma. The various positions of shifting are indicated by the outlines in order 1, 2, 3, and 4.

No. 10. The various positions are indicated by the dotted lines. Nos. 1 and 2 when the affected eye fixed, no. 3 when the unaffected eye fixed.

No. 11. This eye oscillated slightly, which probably accounts for the short distance between the blind spot and the scotoma.

Nos. 10, 12, 13, and 14 show the relation of this scotoma to the angioscotoma. The effect is not particularly characteristic of this condition, nor does it necessarily mean organic lesion of the retina.

No. 4 showed continual small oscillations during the entire test.

No. 16 shifted until the blind spot had been outlined. When the blind spot has been heavily outlined all of these eyes fix better.

The actual subjects for the study of the scotoma were selected from a group of private cases of strabismus of all varieties. They have been under observation from three to ten years and most of them have been examined a number of times. About one-half have been restudied for the scotoma, and in two cases numerous charts have been made at frequent intervals. The results have always been consistent.

was known to be affected in eleven out of the sixteen cases. Five indicated some other near relative affected and five gave a history of more than one member being affected.

The history of the onset of squint showed that eight were affected when three years old, three before that, and one after that age. The answers of the remaining four showed that they were affected some time before the sixth year (indicated on the chart by the words "very young"). The average age of onset was two and one-half years.

The left eye was affected thirteen out of sixteen times in this series. The affected eye showed simple hyperopia in eight, and compound hyperopic astigmatism in eight.

The uncorrected visual acuity of the affected eye (under a mydriatic) was 2/60 in 1 case, 3/60 in 5 cases, 6/60 in 5 cases, and 6/30 to 6/15 in 5 cases; the poorest being 2/60, the best 6/15, and the average uncorrected acuity apparently 6/75.

The corrected visual acuity of the affected eye under a mydriatic was 6/12 in 1 case, 6/15 in 7 cases, and 6/60 in 2 cases; the poorest being 6/60, the best 6/12, and the average corrected visual acuity 6/22.

From this small series we could determine the characteristics of their composite. We may thus outline the characteristics of the scotoma as follows:

- 1—Two degrees in diameter.
- 2—The center of the scotoma coincides with the center of fixation.
- 3—The scotoma is absolute.

Certain other factors which are related to the scotoma need consideration.

The similarity of the scotoma of strabismus to the central scotoma formed by the after-image of a strong light⁶ suggests that it might be subject to those changes which the after-image scotoma shows. In a previous communication⁷ dealing with angioscotometry, widening and narrowing were demonstrated in the scotoma

which connects the blind spot of Mariotte and the central scotoma. Two particularly suitable subjects of the scotoma of strabismus were therefore selected for detailed study. Widening of this scotomatous bridge ("cecocentral") was easily demonstrated by the same means as produced changes in the angioscotoma, namely, pressure on the globe, holding the breath, holding the head lower than the trunk, and pressure over the veins of the neck and on the opposite eye⁷. It is also widened by fatiguing the retina with a strong light.

We are therefore justified in concluding that the central scotoma of strabismus is connected to the blind spot by an angioscotoma.

In studying the scotoma it has been necessary to select the most dependable material possible. (This has necessarily eliminated small children, in whom marked deviations are most common). Marked deviation of the affected eye has also been excluded, because it is not possible to maintain fixation satisfactorily by the use of the unaffected eye when the angle of deviation is great.*

Since relatively slight disturbances result in changes in the angioscotoma, and since a relation between it and the scotoma of strabismus has been demonstrated, it has been deemed advisable to seek evidence of the influence of extreme inrotation on the cecocentral angioscotoma and on the scotoma of strabismus.

Five normal subjects were first examined to demonstrate the blind spot and the small horizontal angioscotoma which extends from it about seven degrees toward the macula. The eye was then inrotated until the line of vision just passed over the bridge of the nose. The blind spot and angioscotoma were then remapped. In none of the cases were changes of any sort demonstrable. It was, however, necessary to interrupt the test frequently, because the contracted extraocular

* Both these points have been emphasized repeatedly by numerous workers including Wadsworth⁸, H. Derby⁹, and Noyes.¹⁰

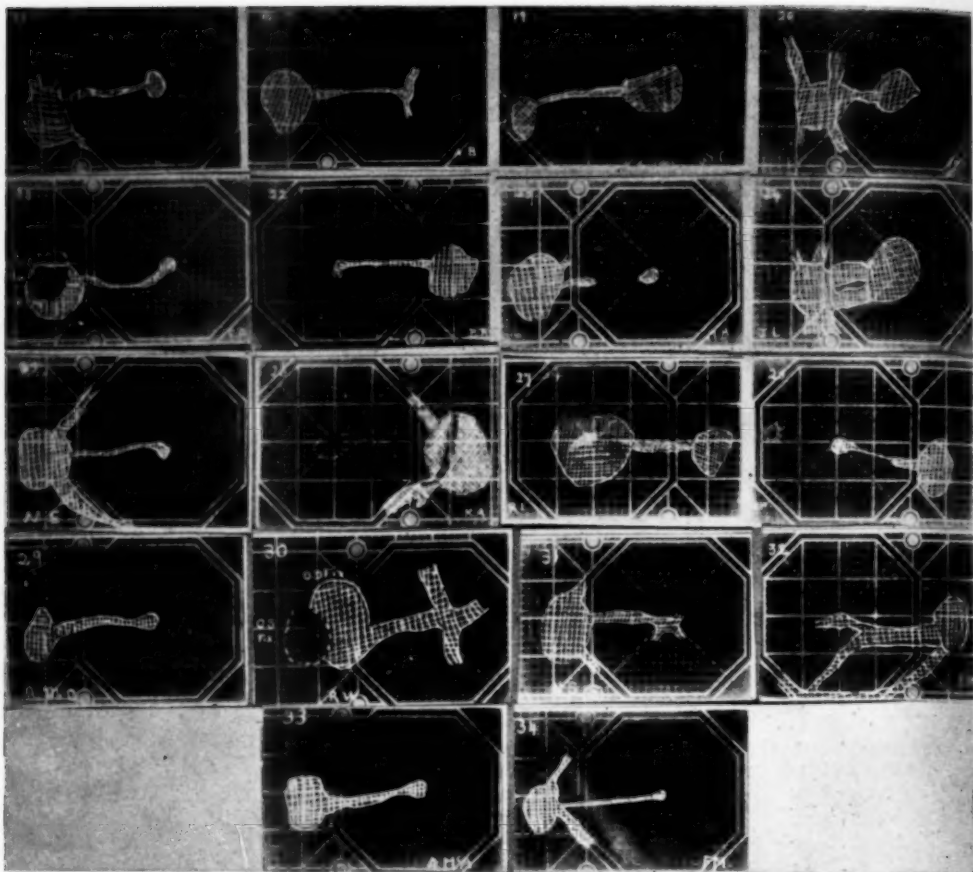


Plate 2 (Evans). (Rejected cases.) These charts are included for the sake of comparison, and also that they may be used in conjunction with the appended table of rejected cases so as to serve in the proper study of the problem as a whole.



Plate 3 (Evans). Figures 1 and 2 demonstrate not only the similarity of the after-image scotoma to that of strabismus, but also demonstrate that the scotoma of strabismus is associated with the angioscotoma and participates in some of its alterations. Both maps were made on the same subject (not included in the series of thirty-four).

In figure 1, A is the usual extent of the horizontal angioscotoma; B is its extent when the after-image is created at the macula.

In figure 2, A shows the usual central scotoma of strabismus with the angioscotoma bridge to the blind spot; B is the widening effect found after exposure to a light placed excentrically at C.

Table 3
Table of rejected cases.

(Most of these cases could be accepted as meeting the requirements of this study were it possible to obtain reliable histories. Transient deviations of infancy and early childhood may be easily overlooked or forgotten. In a number of cases where an early deviation was denied it was found in childhood photographs. Relatives do not like to admit they squinted at one time, for fear they will be held responsible in some way for the poor vision of the case studied.)

No.	Case	Age	Sex	Onset	Vision	Correction	Vision	History
17	J.H.	42	F	?	O.D.V. O.S.V.	3/21, w.+5.50s. w.+2.50c. ax. 30°=6/6 3/60, w.+5.50s. w.+2.00c. ax.135°=6/30	Denies personal and family history	
18	A.B.	18	M	3 years	O.D.V. O.S.V.	6/6, 6/30,	+0.50c. ax. 90°=6/4 +1.25c. ax. 75°=6/15	In doubt as to personal and family history
19	S.C.	49	M	very young	O.D.V. O.S.V.	33/60, w.+4.00s. 6/15, w.+1.50s. w.+0.50c. ax.180°=6/4	=33/60 =6/4	Double advancement
20	W.W.	31	M	very young	O.D.V. O.S.V.	6/60, w.+2.50s. w.+0.50c. ax. 90°=6/4 6/60, w.+4.00s. w.+0.50c. ax. 90°=6/21		Injury to O.S., father squinted
21	C.D.	43	F	very young	O.D.V. O.S.V.	6/7, w.+0.75s. w.+1.00c. ax. 90°=6/4 6/60, w.+1.50s. w.+0.75c. ax. 90°=6/12		Divergent, no family history, operated?
22	B.B.	22	M	very young	O.D.V. O.S.V.	6/12, w.+0.75s. w.+1.00c. ax. 90°=6/12 6/7, w.+1.00s. w.+0.50c. ax. 90°=6/4		Head injury, no family history
23	M.B.	29	M	very young	O.D.V. O.S.V.	6/60, w.+2.00s. w.+0.50c. ax. 90°=6/12 3/60, w.+4.00s.		Eye inflamed in childhood. No family history
24	J.L.	42	M	10 years	O.D.V. O.S.V.	6/12, w.+2.75s. w.+0.75c. ax. 90°=6/4 6/12, w.+2.50s. w.+0.25c. ax. 90°=6/7		Head injury, no family history
25	M.E.	36	F	9 years	O.D.V. O.S.V.	3/21, w.+3.50s. w.+0.50c. ax. 90°=6/7 3/21, w.+3.50s.		No family history
26	K.A.	63	F	?	O.D.V. O.S.V.	6/21, w.+1.50s. 6/15, w.+0.75s. w.+0.50c. ax.180°=6/4	=6/21 =6/4	All history denied and still shows slight squint
27	R.L.	24	M	?	O.D.V. O.S.V.	3/60, w.+2.00s. w.+0.50c. ax. 90°=3/60 6/12, w.+1.50s.		Unreliable history
28	E.W.	53	F	very young	O.D.V. O.S.V.	6/12, w.+2.75s. w.+0.75c. ax. 90°=6/4 6/15, w.+2.50s. w.+0.25c. ax. 90°=6/12		Recurrent iritis, aunt squinted

Table 3 (continued)

No.	Case	Age	Sex	Onset	Vision	Correction	Vision	History
29	A.McC.	26	M	3 years	O.D.V. O.S.V.	6/6, w.+0.50s. 6/18, w.+1.00s.	=6/4 =6/7	Internal squint first, external squint later, uncle had squint
30	R.W.	19	M	4 years	O.D.V. O.S.V.	6/7, w.+0.50s. w.+0.25c. ax. 90° 6/60, w.+2.00s. w.+1.00c. ax. 15°	=6/4 =6/15	Father and uncle squinted, oblique nerve entrance
31	M.S.	13	F	2 years	O.D.V. O.S.V.	3/60, w.+7.00s. w.+1.00c. ax. 90° 1/60, w.+7.00s. w.+1.00c. ax. 135°	=6/6 =3/60	No family history
32	F.H.	9	F	very young	O.D.V. O.S.V.	3/60, w.+3.00s. w.+3.00c. ax. 150° 6/60, w.+3.50s.	=3/60 =6/6	Eye inflamed at birth and for many weeks; mother had squint
33	M.McB.	9	F	3 years	O.D.V. O.S.V.	6/12, w.+1.25s. w.+0.50c. ax. 90° 6/15, w.+2.00s. w.+0.75c. ax. 90°	=6/6 =6/15	Grandfather squinted. Possible head injury, nonconstant squint
34	F.M.	26	M	?	O.D.V. O.S.V.	3/60, w.+5.50s. w.+0.50c. ax. 105° 3/60, w.+4.50s. w.+0.25c. ax. 75°	=6/6 =6/21	No personal or family history but still shows slight squint

muscles set up fine tremor-like movements which disturbed fixation and produced distortions of the plotting.

Five of the sixteen selected strabismus cases were studied in the same way. In none of them could it be established that extreme inward rotation produced changes either in the central scotoma or in the connecting angioscotoma (cecocentral connection).

Visual acuity fields

The next evidence to be sought is most obviously the relation of the scotoma to the reduction of visual acuity. In order to do this it is necessary to establish the visual acuity isopters for that region of the retina represented by the scotoma.

A review of the literature for studies embracing the problem of acuity fields is disappointing. Of the available material the contribution of Wertheim¹¹ is the one most nearly approaching the requirements of this study. His curve makes it evident that the acuity isopter of 2.5 (evidently the smallest to be mapped) would correspond to a fifty per cent reduction in vision.

Traquair¹² has plotted the most recent and reliable work on isopter curves, but it is unsuited to the present problem; first because insufficient detail has been included to embrace the affected two-degree zone, and second because the studies were made with a single-dot object.

Even the term "visual acuity" is open to broad interpretation, and there is a great difference of opinion as to what means should be used for making the test. We may refer to the visibility of a star, but this neglects form entirely and would refer only to our light minimum sense¹³. Percival, quoting Professor Barnard of Yerkes Observatory, points out that it is possible to see a double star as composed of two points of light if their angular separation is as little as 0.44 second. He considers that this is not a measure of the form sense

but only of light difference. He goes on to show that our ability to align the hair lines of a vernier represents an angle of one second, but that this again is fundamentally a test of light difference.

A break in continuity sometimes called contour acuity may be measured by the overlapping of a black and white card. Hartbridge¹⁴ credits this method to Hering, who found the angle to be ten seconds. Hartbridge used a disc with a small notch and found the angle eleven seconds.

When a single point is used—point acuity—(Lohmann¹⁵) and the isopters plotted, recognition of form is not concerned, movement and contrast being the factors. They represent a much more primitive function than is implied in the ordinary meaning of the term visual acuity.

"Form acuity" should be reserved for the measure of the macula's ability to resolve complex shapes, and may be determined clinically by the separability of two points.

In order, then, to establish the relation of this small blind area to the visual field in general and the central visual acuity in particular, a series of studies was made in an endeavor to plot the field of acuity for objects corresponding in size to those used in mapping the scotomata. An effort was made to simulate clinical conditions in order to further the accuracy of the comparison.

The fields of ten carefully checked normal eyes* were mapped at twenty feet with three intermediate fixation objects and an illumination of thirty foot-candles**. Refractive errors were carefully corrected and no case was accepted showing more than one diopter of astigmatism. The test object was a black strip tipped on one side with two white squares of one

minute size separated by an interval of one minute. The other side of the strip was tipped with white bar one minute by three minutes. As the object was moved against a black background toward the fixation point it was alternately turned to present the two squares and then the strip. When the object could be recognized as two dots as distinguished from the single white bar the reading was taken. Each of six meridians was repeated three times and an average of each charted. It was necessary to work carefully to avoid retinal fatigue.

It is of course evident that a study of this nature cannot have a strictly scientific value, because fixation cannot be guaranteed. It does seem justifiable, however, to use the results obtained for this comparison and for interpretation of the clinical material herein presented.

The accompanying charts illustrate the results of this work, and the accompanying perimeter and campimeter charts show the relation to the field in general.

It is thus evident that an object recognizable by its two-minute interval will place the isopter curve at about one degree from the center of fixation, and so produce a circle whose diameter is two degrees.

From this study we can thus conclude that a scotoma extending one degree in each direction about the fixation point or two degrees in diameter would render unrecognizable a test letter whose limbs measure two minutes in width.

Making allowance for the difference in type of material and of technique used, it seems justifiable to conclude that this more clinical study gives results comparing very closely with the results obtained by Wertheim¹¹ in his strictly laboratory investigation of the acuity field. A two-minute interval projected six meters on a tangent surface measures 3.5 mm.* This is

* This work was actually done four years ago in conjunction with an entirely different problem on which Dr. R. I. Lloyd was working.

** Guillery¹⁶ quotes Groenouw to the effect that the intensity of illumination may be varied in a ratio of one to thirteen without appreciably affecting the visibility of points.

* The natural tangent value (0.000582) for two minutes times the distance in millimeters (6000 mm.) gives the size of the projected area in millimeters (3.5 mm.).

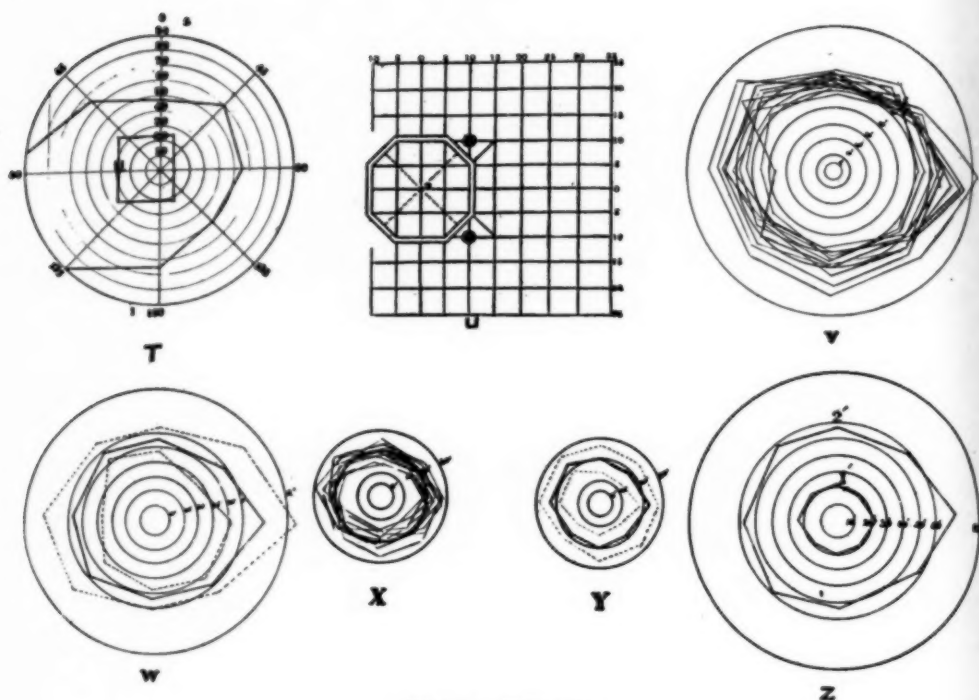


Plate 4 (Evans).

X represents the superimposed boundaries for the one minute object (the one-minute visual acuity isopter).

Y represents the average of these, the dotted lines being the smallest and the largest respectively.

V represents the superimposed boundaries for the two-minute object (the two-minute visual acuity isopter).

W represents the average of these, and the dotted lines the smallest and largest respectively.

Z shows the isopters for the average one and two-minute objects plotted together.

T. In order to visualize the relation of this small area to the visual field, it is shown as a mere point over the fixation mark. The square marked U indicates the relation of the stereo-campimeter field to the perimeter field as outlined.

U shows the relation of these isopter curves to the field as projected on the stereo-campimeter chart, so that the relation of the isopters to the scotomata of this study may be the better comprehended. (This is a very vivid means of demonstrating the minuteness of the reading area of the retina).

the size of the limbs of the letter in the 6/12 or 20/40 line. The subjects of this study could not recognize letters on the 6/12 line, but only those of the 6/22 line, whose limbs (5.5 mm.) were approximately 2 mm. wider. It therefore seems apparent that we must search for other evidence in the further relations of the scotoma before we can interpret the reduced acuity.

It is proposed to consider next the relation of the "wandering movements" to the scotoma. While plotting the scotoma great care had to

be taken to avoid confusion incident to the "wandering movements" which these eyes manifested. The more obvious question is as to the relation of the scotoma to the position of a squinting eye. Though these eyes are cosmetically parallel, we are justified in still considering them as strabismic with the deviation of but one or two degrees. It is therefore apparent that a certain relation of the scotoma and deviation has already been demonstrated by the charts, and it may be expected that the "wandering movements" may represent a

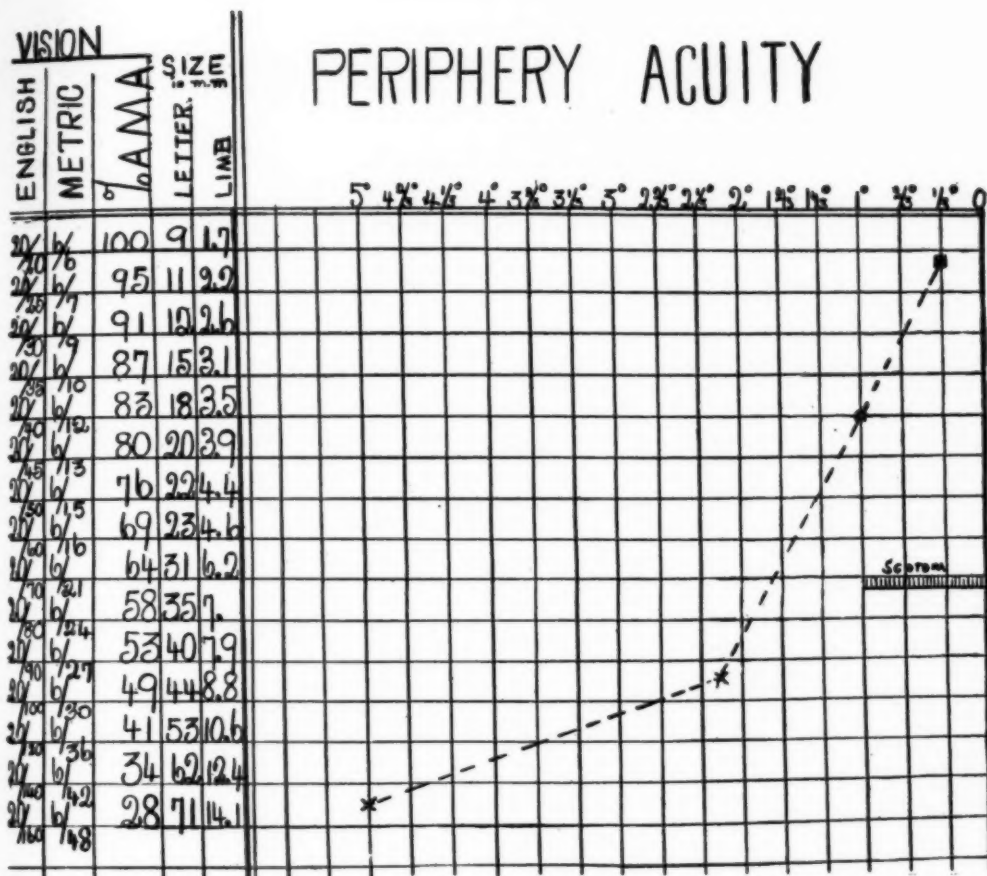


Plate 5 (Evans).

This chart is inserted to provide a roughly graphic means of visualizing the relation of the visual acuity isopter to the test type acuity and to the position of the scotoma.

The numbers in the vertical columns represent the visual acuity as ordinarily used in English, the French metric fraction, and as a measure of visual efficiency as suggested by the Committee of the Section on Ophthalmology of the American Medical Association.

(This last was necessary in order to provide a rough means of comparison with the acuity scale set by Wertheim—see notes to plate 4.) The size of each letter and of its limbs in millimeters is also tabulated to correspond.

The horizontal row of numbers represents the number of degrees from the macula (which is at 0).

The isopters for 2.5° and 5° as set by Wertheim* are indicated by the small crosses, those derived from the study here outlined are marked as black dots. By joining these two systems we get a curve which gives us an idea of the sharp drop in visual acuity as we pass peripherally from the macula.

It will be noted that the scotoma would have to extend 2/3° further outward in order to cut the isopter which corresponds to 6/22 acuity. This 2/3° therefore represents the inconsistency in the relation between the acuity of the subjects and the size of the scotoma.

*Wertheim's study seems to be the most nearly scientifically correct which is available. His results are difficult to compare because he uses an arbitrary scale for denominating the acuity. He divides the distance from the macula to 25° into tenths, as will be noted. The objects which he used seem definitely to meet the requirements for measuring the form sense. The classical work of Dor is not deemed sufficiently refined for comparison.

modified phase of the original deviation and so disclose related evidence. It was first necessary to become familiar with the nystagmoid or wandering movements of the normal eye. That such movements are present is common knowledge. The fact is called to our attention daily through the use of the corneal microscope. In fact the movements are so extensive as to make the higher powers of magnification well nigh useless.

A review of the literature dealing with the movements does not provide a wealth of adaptable material. Certain fundamental principles however are acceptable. J. Ohm¹⁷ injected cocaine into the vitreous of a cat. This produced total temporary blindness and stopped the animal's normal nystagmus (which Ohm says exists in dim light). The inference would seem to be that some light perception is necessary to give rise to these movements. This idea of course does not have its origin in the work of Ohm nor in the field of laboratory research, for we meet it in clinical work as a well accepted law. Barries and Meisling¹⁸ studied nystagmus in normal dark-adapted eyes by means of phosphorescent strips. They found that with the development of the two degree scotoma which occurs under the circumstances an atypical nystagmus was produced.

The writer has not succeeded in devising a perfectly satisfactory clinical method of recording these movements of the normal eye, but several methods have been employed which demonstrate their nature. These methods employ the projection of an after-image.* An after-image at the macula when projected represents a central scotoma, of variable diameter—depending on the accuracy and duration of fixation and the amount of irradiation etc. Our study will therefore have to do with the movements of eyes in which a small tem-

porary central scotoma has been created.

(1) The simplest procedure is to fix the gaze intently upon the edge of a black picture frame against a light background. (It is best for the general illumination to be fairly strong, perhaps thirty foot-candles.) At first the outline of the frame shows a sharp-edged contrast to the background, but soon a fine light border appears like a halo where the edge of the frame meets the wall. Later we become conscious that this line is widening, and we note also that its width varies in a sort of oscillation. If the light in the room be flashed on and off the halo becomes more vivid.⁹

(2) A second, more positive method is employed in which an after-image is produced by gazing at the glowing filament of an electric light bulb (the long tubular bulb with a single line-like filament is best adapted). The after-image is then very intense and may be projected twelve meters upon a white card on which a vertical black line has been drawn (1 cm. wide and 100 cm. long). The subject makes an effort to keep the after-image coincident with the center of the black line. If the general illumination of the room be flashed on and off the after-image is more definite. The after-image will be seen to move horizontally in a more or less irregular way, and its excursions may be timed. The amplitude of these oscillations may be estimated by placing marks on the chart in accordance with the subject's signal (the furthest movement of the after-image from the black fixation line—both to right and left).

Ten plottings were made by this second method. None of the subjects had a greater error of astigmatism than 0.50 D. All had normal central visual acuity. Each eye was tested separately. There was no evidence of ocular anomalies or disease likely to

The conditions for these studies, while open to definite criticisms as

* It is not practical to study satisfactorily the movements of an after-image created excentrically.

to their exact scientific value, indicate that:

(1) The horizontal movements seem to be irregular in both rate and amplitude, but sufficiently rhythmic nullify the value of the results.

to warrant the term "oscillating." (They may be called "wandering").

(2) The rate varies from about ten to about forty times a minute.

(3) The amplitude of the movement is about one minute of arc.

This after-image method of testing has been used because it approaches the clinical conditions obtained during the stereo-campimeter test.

It thus seems fair to state that "wandering movements" of the normal eye can be demonstrated by the creation of an after-image scotoma and its projection at a suitable distance.

The ideal and logical procedure would be to study the movements of the scotomatous eyes by this same technique; but a sharply defined after-image can not be created, because the movements are irregular. The use of a stronger stimulus over a shorter time is not without danger to the retina, so that it is not warranted in the class of subjects here studied.*

Summary of studies

We are now in a position to summarize the evidence as found under the conditions of this investigation.

(1) The demonstration of an absolute scotoma in strabismus, approximately of one degree radius.

(2) Evidence that the scotoma of strabismus is related to the angioscotoma.

(3) Evidence that the scotoma in strabismus and its cecocentral connections are not affected by turning the eye strongly inward.

(4) Evidence that visual acuity approximately one degree about the macula is equal to 6/12, whereas the visual acuity of the subjects of this study averaged 6/22.

* Helmholtz points out this danger in his discussion of after-image.²⁹

(5) Evidence that similar "wandering movements" of the normal eye can be demonstrated by the creation of an after-image scotoma.

The literature

Before attempting to interpret this evidence it is proposed to collect that which bears on the subject from the literature.

Very rigid elimination of all possible conditions giving rise to a central scotoma simulating that of strabismus renders most of the earlier contributions valueless for comparison. It must not be understood that the writer disparages the excellent work of any of the earlier contributors. The present study would have been impossible without them. The authorities cited are of course well known for their reliable and valuable contributions.

These workers may be divided into four groups:

(1) Those whose opinions have evidently been drawn from a broad impression rather than from a specially planned analytical type of study. Among these we may place Noyes¹⁰, Schweigger²⁰, Bull²¹, Guillery¹⁶, and a host of less noted workers. (2) Then we find a group whose evidence has been accumulated from material of questionable reliability and value. We may place in this group such workers as Buchanan²², Straub²³, Worth²⁴, Grim²⁵, Blatt²⁶, Treitel²⁷, and so forth. (3) A third group seems to have used someone else's material for a re-analysis. This method is more typical of the textbook, and perhaps Lohmann¹⁵ may be placed among these. Uhthoff's²⁸ contribution may be included under this heading and also under group 1. None of these contributions is sufficiently parallel to the present study to warrant detailed analysis. (4) The fourth group, more encouraging, is composed of two workers—de Schweinitz²⁹ and Heine¹. The work of de Schweinitz has a very definite though negative value, as his study demonstrated

satisfactorily that in those eyes with defective peripheral fields for form and color, and with a large central scotoma, we are dealing with the pathological.

We have in the remarkable work of Heine¹ not only a very careful tabulation, but also a description of his technique, which very closely parallels that used in this study.*

4, vision.—His figures included vision for the good eye which was worse than 6/8. He does not state the reason for the decreased acuity. This would not rule out pathological causes. Worse than 6/6 is not acceptable.

5, histories.—While it is impossible from his data to be sure the history is satisfactory, we accept his statement that he had sufficient informa-

Comparison of averages

	Age	Eye O.D.	Eye O.S.	Visual Acuity uncorrected	Visual Acuity corrected	Size of scotoma
Heine	15½	5	7	6/75	6/44	5.5° by 6°
Present Study	25½	3	13	6/75	6/22	2° by 2°
Averages	20½	4	10	6/75	6/33	4° by 4°

The very satisfactory table which he supplies of his series of one hundred cases allows the separation of twelve which probably correspond to the sixteen of the present study. Perhaps one or two more could have been ruled out were more details available, but those included will doubtless represent a fair average. Using Heine's numbers, those deemed most nearly to meet the requirements set for the present study are 1, 3, 4, 5, 8, 15, 33, 43, 47, 48, 59, and 62. To be sure only cases 4 and 5 seem to show parallelism.

The following are the reasons for ruling out unsatisfactory cases from Heine's table of one hundred:

1, age.—All younger than twelve years are discarded. His figures included some as young as six years.

2, diagnosis.—His figures included divergent squint. These are not acceptable. A few have an obscure meaning and a number had been operated on.

3, refraction.—He included cases of myopia, of high astigmatism, and of unknown error. These are excluded from the present study.

tion to class them as congenital.

In considering these averages, other factors of Heine's work must be included:

(1) It is not clear whether the visual acuity given was that taken while the eye was under a mydriatic or not.

(2) He does not state other conditions under which the visual acuity was taken.

(3) The scotomata are stated as relative and for colors. He evidently feels that a white object seen through a red glass is equal to a red object for mapping a "red scotoma." They probably do not have the same value, however.

(4) Most of the subjects evidently had definite amounts of strabismus at the time of mapping, so that fixation could not be so steady as if the eyes were more nearly parallel.

(5) It is necessary to assume that the material was appropriately selected.

It thus seems fair to conclude that the work of Heine is reasonably well supported by the present study.

Theoretical consideration

Before attempting to interpret the evidence collected from the present study and from the literature, it is wise to recognize that such a theoretical discussion is possible only by

* The use of colored filters and white objects against a dark background is carefully explained in his paper. Like the better known method of Schloesser it must be noted that both in the principle and purpose of its application it differs from that herein described, but that in all probability it accomplishes the same results.

keeping in mind the type of material here selected. In fact it is almost impossible for us to define the subject at all, because we lack the necessary accurate understanding of the other factors making up the syndrome. No effort will be made therefore to correlate the present detailed study with the problem as a whole. It is proposed only to submit an explanation which may help to show the interrelation of the evidence herein presented, namely, the scotoma, the visual acuity, and the wandering movements.

For the sake of completeness the author will suggest a postulate not in any sense original nor yet lacking evidence to support it, but useful at this point only as a logical step in providing an etiological foundation for the scotoma and to account for its characteristics. Let us first recall that in embryonic life the macula is grossly undifferentiated from the peripheral retina, and that in order to expose the most specialized elements of this region the more internal layers must be drawn back. This drawing back or uncovering and the development of a macula continue "until at least sixteen weeks after birth," according to our present conception as set forth by Mann³⁰. Salzmann³¹ tells us that the capillary-free area of

the retina, measuring 0.4 to 0.5 mm. in diameter, corresponds to the area over which the cerebral layers are lacking. According to Tscherning³² 0.004 mm. of the retina equals one minute of arc. Our scotoma measuring two degrees across would therefore represent an area of retina measuring 0.48 mm. Here we have the central area of retina corresponding in size to the two-degree scotoma of our strabismus cases.

It has been demonstrated by Seefelder and Wolfrum³³ that the uncovering of this area may be interrupted, and they have actually presented material to show that such may have occurred in eyes known to be amblyopic.

Stilling³⁴ has given us a very valuable piece of work in which he points out that the position of rest of hyperopic eyes is inward rotation. It seems reasonable to conclude that these eyes may seek the position of rest because they are in a relative state of rest.

Normal fixation presupposes a sharp image formation at the macula. A normal macula will lose its ability to fix if it lacks the necessary early education. We have ample evidence for this not only in the literature but in every-day practice. The macula is

Table 4
Abstracts of Heine's cases.

Hist. no.	Age	Eye	Error	Vision uncorrected	Vision corrected	Size of scotoma	Comments
1	24	O.S.	+1.00s.	?	6/8	2°by3°R	Note big scotomata occur in cases which do not show improved vision on correction or which are emmetropic. Heine did not use the stereo-campimeter, which may account for the large scotomata through poor fixation. Most of his cases had deviations which imply poor fixation as a fundamental principle. Heine evidently used the letter R in the last column to indicate a scotoma for red
3	15	O.S.	+1.00c.	6/12	6/8	2°by2°R	
4	22	O.D.	+2.50c.	6/36	6/12	2°by3°R	
5	42	O.S.	+5.00s.	6/18	6/12	2°R	
8	15	O.D.	+2.50s.	?	6/12	5°R	
15	16	O.D.	+1.00s.	6/24	6/24	2°by3°R	
33	13	O.S.	+1.00s.	6/60	6/30	7°	
43	14	O.S.	+4.00s.	6/60	6/60	10°	
47	19	O.S.	+2.50s.+2.50c	3/60	6/60	5°	
48	17	O.D.	+5.00s.+1.00c	3/60	6/60	10°	
59	11	O.D.	+6.00s.	3/60	3/60	15°	
62	24	O.S.	+3.00s.+2.00c.	2/60	3/60	present	
Average	19½	O.S. 7 O.D. 5	Simple hyp. 7, comp. hyp. astig. 5, hyp. astig. 2.	6/75	6/44	5.5° by 6°	

probably more susceptible to rapid education in this sense than the more peripheral retina, first because the macula is more highly specialized and secondly because it is more perfectly situated optically.

If then the macula is rendered relatively functionless by the developmental defect, the healthy peripheral retina would perhaps take longer to develop its powers of fixation than would be required of a normal macula.*

If these statements are acceptable, then we have explained how it is that eyes of the series herein studied come finally to assume the cosmetically parallel position though they are actually still deviating two or three degrees.

This explanation accounting for the presence of the scotoma on an organic basis might seem to imply that it would be useless to expect that educational means could remove the defect. This, however, does not necessarily follow. If we could create the stimulus necessary to cause the uncovering process to be resumed we should then expect acuity to improve to normal. Uhthoff²⁸ makes reference to a long list of authors who reported cases in which improvement had occurred. That a temporary scotoma having like characteristics to the scotoma of strabismus may be created by the production of an after-image is significant. Also that both these scotomata bear similar relation to the angioscotoma again suggests that the original defect need not of necessity be permanent. If a case originally showing 3/60 vision were to improve to 6/12 we should however not be justified in reporting even a partial cure, as the 6/12 acuity is still accounted for by a two-degree scotoma and such improvement would simply imply that a more nearly central region of the retina was in

use than at the time when the acuity was 3/60.

In summarizing the visual acuity of the subjects of this study, we see that, whereas the acuity averaged 6/22, some cases showed as good as 6/12 and some as poor as 6/60. Our isopter for a region one degree about the macula seems to indicate that a letter seen one degree excentrically would have to be equal in size to one in the 6/12 line. It is necessary, however, to allow for two important factors.

First, a letter fixed by retina immediately at the rim of the defect would not be recognizable, because part of it would overlap the functionless region. Letters measuring approximately 182 mm. (the size of a letter in the 6/12 line) would therefore have to be fixed excentrically enough to permit the entire image to fall on active retina. Moreover the "oscillating" or "wandering" movements would doubtless tend to widen this inactive zone about the scotoma. It is to be remembered, however, that making broad allowance for these conditions would only increase the size of the defect a few minutes at most. Even such small enlargement of the depressed area would mean a much greater drop in acuity than one might expect, as the isopter curve declines very abruptly here.

The second and probably more important allowance to be made in considering apparent discrepancy as to the visual acuity relates to that most variable factor the "human equation". Not only should we allow some sort of leeway for the subject but for the examiner as well.

These factors, when considered in our final judgment, make it seem reasonable to conclude that the scotoma satisfactorily accounts for the decrease in visual acuity found in the subjects of this study under the conditions of this investigation.

Having considered a possible explanation of the presence and characteristics of the scotoma, and of the relation of the reduced acuity to the

* There is uncertain evidence that the macula is not fully "educated" until the seventh year, and it may appear that one degree excentrically takes twenty years to learn the trick of fixation.

defect, we are in a position to consider the relation of the scotoma to the present position of the eye and to its "wandering movements."

We have seen that with the production of an after-image at the macula we not only create a scotoma quite similar to that found in strabismus but also reproduce the wandering movements.

Our present conceptions of retinal fatigue and recovery may help to explain the similitude.

We have suggested that evidence pointing to the use of retina more or less adjacent to the defective region may explain the reduced acuity in these eyes. In Parsons³⁵ recent work he says: "The rate of regeneration of the substance (visual purple) is quicker for cones than for the rods, which accounts for the much quicker adaptation of the former (cones three minutes, rods thirty minutes)." This broad principle seems to clarify the present problem. The perceptive elements must regain their physico-chemical balance before they are capable of further response; unfatigued retina must be shifted to the position of that just exhausted. The new position is however physiologically inferior, so that there is a shift back to the original site as soon as recovery has been accomplished. The process is repeated but, since the more excentric retina recovers slowly, the shift is likely to be in the opposite direction from the first shift, thereby allowing a longer recovery time for peripheral retina than is allowed for the central. Such a sequence seems to be borne out by the after-image studies.

If we now apply this series of events to the eyes of this study in which an area about one degree from the macula in all directions is reduced in function, we may find it possible to explain the wandering movements.

We have suggested that such an eye has learned to fix with a part of the retina just peripheral to the border of the one-degree defect. When this is exhausted the shift seems to be

diametrically opposite on the same meridian. It is probable that it passes through the scotomatous region, and this explains why these patients often say a letter "flashes in and out again" as they are studying it. The second position is next exhausted. Normally the shift would be back to the macula, but, since this cannot be, the point of primary fixation is sought. It may be that this primary region is not yet recovered, in which case perhaps a point above or below on the same isopter of acuity would be used.

The exact sequence of steps in these movements is far from demonstrable, but this explanation seems to fit such evidence as is available. Points of equal acuity seem to be arranged about the macula equidistant from it, so that any sequence from one of these points to the other would be possible. The horizontal "oscillation," however, not only seems to predominate in these scotomatous eyes but also in normal eyes. It is possible that the "growing out of" squint means that the child has learned to select the diametrically opposite points of that acuity isopter best adapted to his peculiar requirements. If he cannot get a sufficiently clear picture during the period of education, the position of rest is maintained—he retains the squint.

There is one other point bearing on the selection of the peripherally placed isopter which may have important significance. Helmholtz¹⁹ makes the statement that in regarding an object the eye seeks that region of the retina best suited to the conditions. If, because of a defective macula, high refractive error, and so on, the acuity is reduced to 1/60, then for fixation that isopter might be used which is best suited to this low level. This would mean that a detailed study of the letter, perhaps with many points of successive fixation, would result in its recognition by the appropriate retinal zone for 1/60 acuity. If this zone were far out—due to the central scotoma plus

a wide area depressed by the defective refraction and so on, it would either remain deviated because of suppression or would "wander" through a very wide arc. This idea is of course poorly supported by direct scientific evidence, but clinically it is well supported.

The final impression which this study leaves is that under the conditions of this investigation we may say that

- (1) These amblyopic eyes showed some squint though only of one or two degrees.
- (2) One hundred per cent of these subjects had a demonstrable absolute central scotoma.
- (3) A visual acuity in the neighborhood of 6/22 was typical of these amblyopic eyes.
- (4) There were others in the family with a similar condition.
- (5) Moderate degrees of compound hyperopia and astigmatism were typical of the subjects.
- (6) The left eye was most commonly affected.
- (7) Less than twenty per cent of all cases were accepted as demonstrating pure strabismus, in the sense here stipulated.
- (8) The reduced vision was satisfactorily explained by the scotoma.
- (9) The "wandering movements"

were satisfactorily explained by the scotoma.

- (10) It is possible to relate other elements of the symptom complex to the scotoma.

An effort has been made to avoid a detailed discussion of the various theories of squint, not only as to the etiological factors but also as regards the interrelations of the units making up the symptom complex.

Evidence from such a small series warrants but the most guarded and general conclusions even when applied to a similar material.

It seems very significant that so much material must be very carefully reviewed before these few cases can be accepted. Doubtless many of those discarded from this study might justly have been included, but our present understanding of the various classes of strabismus does not permit a broader selection.

If a sufficient number of groups can be selected with meticulous care, and if the various units making up the complex can be studied in detail, perhaps a satisfactory classification will finally be made which will put the entire problem on a more secure basis.

That the present study is lacking in completeness of analysis is evident, but if this presentation stimulates the interest of other workers it has attained its main object.

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Note: (What is probably the most valuable contribution to this subject has been published since this manuscript was placed in the hands of the publisher, namely the paper entitled "Visual acuity within the area centralis and its relation to eye movements and fixation," by Frank W. Weymouth and others, *Amer. Jour. Ophth.*, 1928, v. 11, Dec., p. 947).

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NOTES, CASES, INSTRUMENTS

A LAMP FOR EYE SURGERY

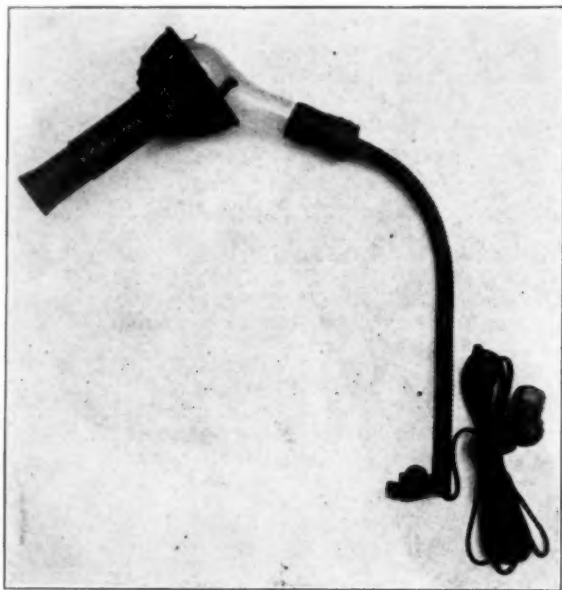
CARL T. EBER, M.D.

SAINT LOUIS

On several occasions, when called upon to operate in strange hospitals, I found that these institutions did not possess adequate means of illumination for the purpose. Daylight is uncertain, hence it becomes necessary at times to carry one's own lamp

2. The bulb is a standard 100-watt nitrogen lamp of blue glass giving a whiter light than the "clear" type, but in case of emergency any globe of similar size may be substituted. The metal shield gives the globe sufficient protection against breakage in carrying.

3. The "goose-neck" has a clamp at its lower end which permits the instrument to be attached to any



Lamp for eye surgery (Eber).

with him. The most widely used lamps require rheostats for reducing the current sufficiently to supply a low voltage lamp; and this makes transportation cumbersome. Again, in case the bulb burns out, considerable delay and inconvenience may result before another can be procured. A nurse or untrained assistant holding a lamp often tires during an operation, and this may cause a serious accident by varying the illumination of the operative field.

Principally because of these difficulties, I have worked out the lamp illustrated here.

1. It is made of light weight material and can easily be carried in a bag.

available upright (such as an irrigator stand) from one-fourth inch to an inch in diameter. (A handle with socket can be substituted for the "goose-neck," thus converting it into a hand lamp.)

4. A limited amount of "focusing" is made possible by means of adjustable telescoped tubing containing two lenses.

The intensity and concentration of the light is not so great as in the "focal lights," but it is quite sufficient for eye surgery in the hospital and minor surgery in the office.

The instrument is made by V. Mueller and Company, Chicago.

1006 Carleton building.

SOCIETY PROCEEDINGS

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology
October 18, 1928

DR. C. E. SHANNON, chairman

Leptothrix infection of the canaliculus

DR. M. E. MARCOVE (by invitation) reported a case of this infection in a woman thirty-five years of age, who for the past few years had fed cows and chickens at home. The condition started three years ago with lacrimation of the right eye. About a year ago, the discharge became purulent, with pressure over the upper canaliculus causing a greenish-gray nodule, about the size of a pinhead, to be discharged from the upper punctum. This had continued, although routine treatment for sac infection had been carried out during this time.

Treatment by the reporter consisted in slitting the upper canaliculus, with expression of three small and one large concretion. The cavity was irrigated with a weak solution of potassium iodide. A weak solution of potassium iodide was also given by mouth. The disease was entirely removed in one week. Specimens were made by crushing the whole concretions upon a slide. The filaments composing the fungus showed very little branching, and were therefore considered leptothrix instead of streptothrix.

Discussion. DR. LEWIS P. GLOVER stated, in connection with Dr. Marcove's case, that there had been one of a different type on Dr. Baer's service last spring. L. W., Chinaman working in a Chinatown restaurant, was admitted having apparently gonorrheal ophthalmia in both eyes. Upon staining the secretion, leptothrix was found. There was a purulent secretion closely resembling ophthalmia in the early stage. The bulbar

and palpebral conjunctivas were studied with pin-head, yellow nodules, but the canaliculi were negative. The secretion remained seropurulent for two weeks, but cleared up entirely with irrigations and instillations of potassium iodide solution three percent. No history could be obtained because of language difficulties.

Edema of the conjunctiva with rhinorrhea

DR. EDWARD A. SHUMWAY reported a case of edema of the conjunctiva associated with rhinorrhea (hyperesthetic rhinitis). The patient, a man seventy-four years of age, had always been troubled with repeated attacks of coryza, and was very sensitive to cold winds. He had also suffered from several attacks of dermatitis, which cleared up in southern climates. The present condition began about one year ago, in the winter time, with sneezing, stuffiness of the nostrils and watering of the eyes, and persistent dropping of fluid from the nostrils, which at times was so profuse as to saturate his handkerchiefs.

Examination showed marked edema of the conjunctiva, which surrounded the cornea like a cushion, and resembled an intense dionin reaction, except that there was pronounced pallor and little secretion. A nasal etiology being suspected, he was sent to Dr. James E. Landis, who reported that there was bilateral ethmoiditis, with hypertrophy of both inferior turbinates, and a boggy appearance with over-activity of the mucus-producing cells. His throat was practically normal. For relief of the over-production of mucus, Fowler's solution internally was advised, two drops three times daily, and local treatment for the ethmoiditis.

The patient was also examined neurologically by Dr. C. A. Patten,

who found a blood pressure of 220/120 and suggested study of the renal function and as to hypersensitivity to proteins. The urine examination revealed nothing except low specific gravity (1006), a very faint trace of albumin, no sugar, diacetic acid, or acetone. Protein tests were made by Dr. Albert Oliensis, and out of many tests the patient reacted only slightly to rye grass, sweet vernal grass, and corn, and nothing in his diet caused indigestion with the exception of apple butter.

The patient was ordered a solution of estivin locally with a boric acid solution, and Fowler's solution internally. Under this treatment the ocular and nasal conditions had improved somewhat, the edema of the conjunctiva had lessened, and the nasal secretion was much less marked.

Dr. Shumway discussed the causes of edema of the conjunctiva, quoting from Saemisch's article in the Graefes-Saemisch Handbuch. It could appear in connection with an acute conjunctivitis, especially of a blenorrhoeic or diphtheric type, also in association with acute inflammations of the uveal tract, acute glaucoma and panophthalmitis. It was also produced by inflammatory conditions in the neighborhood of the eye, such as stytes, acute dacryocystitis, or periostitis of the orbital rim. It had been seen by Spicer in inflammation of the cervical glands, and occurred in cerebrospinal meningitis. In old people it might be due to relaxation of the tissues, especially with Bright's disease, and it might appear in anemia, chlorosis, and exhausting diseases. It might follow perforation of the cornea, by operation or accidental traumatism, or in ulcer, where the opening was covered by conjunctiva. It had also been described in association with urticaria, and by de Schweinitz in two cases of facial neuralgia. It was often an accompaniment of sinusitis, frontal, central, and ethmoidal, and it might assume a recurrent, painful type, fugitive in character, and be

associated with violent headache (de Schweinitz).

The association with rhinorrhea or hypersensitive rhinitis, as in the present case, had not been reported so far as was known to the speaker.

Discussion: DR. JAMES E. LANDIS (by invitation) said the question arose what produced the rhinorrhea, and asked if there was any association between this and the chemosis. The trifacial nerve had an inhibitory action on the glands of the mucous membrane and in trifacial palsy there was a rhinorrhea. This also occurred with stimulation of the ganglia of the cranial nerves or with toxic irritation in the sinuses, through the same ganglia, or in blockage of the lymphatic flow due to swelling of the tissues from infection. He felt certain that the chemosis in both eyes had a direct relationship with the pathology occurring in the nose, because here we could eliminate trifacial palsy, and the skin tests of different plant pollens and foods were practically negative.

Infection in the ethmoid cells produced a toxic effect, namely a bacterial sensitization, upon the nervous control of the nose, the sphenopalatine ganglion. This irritation produced overactivity of the mucous glands. The infection, having extended through the thin bony partition separating the ethmoid cells from the orbital cavity, had evidently caused a certain amount of fibrosis. He believed that the bilateral ethmoiditis was the direct cause of both the chemosis and the rhinorrhea.

The question remained whether bilateral ethmoidectomy was necessary in this type of case? If the patient had any optic nerve pathology, such as an optic atrophy, papillitis, or chorioretinitis, he would suggest surgical procedure, but, because the eyegrounds were negative and on account of the age of the patient, he felt that local treatment of the ethmoid cells would be sufficient to clear up the condition.

This trouble came under the term

of hyperesthetic rhinitis, which was differentiated from hay fever in that in hay fever there were positive skin tests to confirm the diagnosis, and the condition occurred at a given time of the year, while in hyperesthetic rhinitis there was no reaction to skin tests and the condition was perennial.

There remained one other condition to be differentiated, and that was cerebral rhinorrhea as brought out by Bosworth and later by St. Clair Thompson. In cases of pituitary tumor or dehiscence of the sphenoid, we had occasional seepage through of the cerebral fluid. This was differentiated by laboratory tests. Upon examination of the discharge in a case of cerebral rhinorrhea, there was a reduction of Fehling's solution, which was not true in a mucous rhinorrhea, while in rhinorrhea of nasal origin there was a large amount of mucin, which did not occur in cerebral rhinorrhea.

Dr. Shumway, in closing, spoke of the cases of rhinorrhea reported by Priestley Smith, in which there was optic atrophy probably due to tumor of the pituitary body. In the present instance, however, the optic nerve was not involved, and the fluid from the nose could be readily shown to contain mucus, and differed from cerebrospinal fluid in its chemical reaction to Fehling's solution.

Cataract wound infection with facultative anaerobic streptococcus

DR. H. MAXWELL LANGDON and DR. H. M. COBE (by invitation) reported a case published in detail in the *American Journal of Ophthalmology* (1929, v. 12, Jan. pp. 32-33).

A case of myopia and glaucoma with unusual visual fields

DR. G. E. DE SCHWEINITZ reported the case of a colored man, aged 31 years, with myopia (-6.00 and -7.00 D.); chronic glaucoma, with at the time of the first examination deeply cupped discs of three years duration; vision R.E. 6/150, L.E. 6/60; intra-

ocular tension, right 26, left 36 mm. by Schiøtz tonometer; and unusual field defects, namely, nearly complete loss of each upper field above the horizontal meridian, save only a narrow pointed steeple-like area, which passed upward on each side of the upper vertical meridian.

Cyclodialysis performed on the left eye was followed in a few hours by a sharp attack of acute rise of tension, promptly controlled by miotics. Four months later cyclodialysis on the right eye was succeeded by a temporary rise of tension of the left eye, controlled by miotic; tension R.E. 6.5 (therefore subnormal), L.E. 21 mm. This had remained unchanged. The visual fields had not changed and the direct vision had remained about the same for at least four years, but then vision was reduced to, R.E. 4/100, left 6/100. Some vitreous disorganization and moderate retinal perivascularitis had appeared.

During the next year the conditions were about the same, but the steeple-like preserved area in the upper field disappeared, and five years after the first examination and treatment there was, as is not uncommon in advanced glaucoma, complete superior hemianopsia. A point of therapeutic interest was that rises of tension after operation (cyclodialysis) were promptly controlled by miotics, and remained so, whereas prior to operation the miotics were ineffectual.

Loss of vision, and papilledema, caused by excessive uterine hemorrhage

DR. DE SCHWEINITZ reported the history of a Russian woman on whom, when two months pregnant, a criminal abortion had been performed. This was followed by severe hemorrhage which continued for six days, at which time, following violent headache, reduction of vision to light perception occurred. The ophthalmoscope revealed very pallid discs, swollen four diopters; narrow, pale arteries; full, dark veins. Gradually improvement took place, the disc edema subsided, leaving a pale nerve-

head, and the vision, three weeks after the initial hemorrhage, was R.E. shadows, L.E. 4/15. The field of vision presented the appearance of an impure binasal hemianopsia.

A brief reference to the history of these cases was made, and the various ophthalmoscopic appearances were described as well as the visual field distortions, nasal defects having been found in about four per cent of the reported cases. The speaker emphasized the well known fact that such blindness very rarely occurred after purely traumatic hemorrhage, and hence the belief that bleeding in itself was not the sole etiological factor, a predisposing cause having to be predicated—perhaps a lowered resistance due to constitutional malady, or an undetermined toxemic influence. He discussed the various theories which had been advanced to explain the fundus lesions and the field defects, and pointed out that this affection had been observed in horses.

Visit to the Barcelona clinic of Dr. Ignacio Barraquer

DR. G. ORAM RING, after making brief reference to the various approaches to and the charm of Barcelona, detailed Dr. Barraquer's plans for establishing spring and fall ophthalmic courses to embrace both his public and private clinics. (Dr. Ring's paper was published in full in the February, 1929, issue of this Journal, page 98.)

LEIGHTON F. APPLEMAN,
Clerk.

ROYAL SOCIETY OF MEDICINE, LONDON

November 8, 1928

MR. CYRIL WALKER presiding

Shrinkage in congenital cataract

MR. D. M. CARDELL exhibited a case of monocular cataract in a girl aged thirteen years, whose mother had brought her because she had noticed a green color in the pupil. The patient had been short-sighted ever since earliest

childhood. In the left eye the refraction was -15 . The sclerosis in this lens was confined to one sector, and was of the type usually associated with injury; but in this case there was no history of either injury or inflammation. The question was whether it was a congenital condition or due to a detachment of the retina. Projection was good and tension normal, therefore it was assumed that the condition was congenital in origin.

Congenital abnormality of fundus

For MR. MAYOU, Miss Adam showed a case of persistent connective tissue in the right posterior pole at the left optic disc. The child was brought because of defective vision in the right eye; there was no injury at birth. In the right eye the vision was reduced to perception of hand movements; in the left it was 6/6. In the fundus of the right eye was a large membrane obscuring the disc, and partially hiding the vessels; also some extensive pigment disturbance. In the left eye was a small membrane of connective tissue on the nasal side of the disc.

Discussion. MISS IDA MANN said the condition seen in this eye did not represent any normal developmental stage; the membrane was too extensive for it to be a mere persistence of the normal glial tissue on the disc. But the appearance in the left eye was so typically that of a persistent glial sheath that one was obliged to consider the case as one of aberrant development.

MR. TREACHER COLLINS said this was either abnormal formation of fibrous tissue along the central hyaline artery, or a hemorrhage into the sheath of the hyaloid artery at birth, this subsequently forming the basis for the development of fibrous tissue.

Cyst of the retina

MR. O. G. MORGAN exhibited a case in which the cyst was discovered when the patient was examined at school. In a year there had been no altera-

tion in the appearance. He regarded it as a type of Coats's disease with cyst formation. There was three diopeters of swelling, and there was a greenish tinge.

Discussion. MR. M. S. MAYOU referred to a section he had shown at the last meeting of the Ophthalmological Society of the United Kingdom illustrative of this condition. He thought that one of the first changes which took place in the retina was that there was a separation between the layers of the retina, owing to the outer part of the retina becoming adherent to the retinal pigment layer and choroid, probably as a result of primary changes taking place in the choroid. The separation between the layers started as a small cyst, and the separation might proceed to complete semidetachment.

Blood staining of the cornea

MR. MORGAN also showed a small boy who when playing with an air pistol had received the discharge in his face. On the following day he was seen to have a small wound in the sclera. There was also a little retinal edema. A restless and violent night resulted in the whole anterior chamber being filled with blood; there were also plus tension and considerable pain. He was admitted to hospital, but there was no change for two or three weeks. Mr. Morgan did a paracentesis, but the aqueous was pale, without blood content. He therefore concluded the trouble was entirely in the cornea; this was red, and was beginning to turn a brownish tinge. X-rays showed no foreign body. It must have been a glancing blow of the spring which struck the sclerotic. He did not think there could have been a wound of Descemet's membrane. The whole cornea was equally stained with blood.

Discussion. MR. TREACHER COLLINS said he had seen several cases of blood-stained pigmentation of the cornea, and all of them happened after concussion injuries, and usually in patients who had a raised ocular ten-

sion. Blood was effused into the anterior chamber, where it became stagnant, as it was unable to escape; usually there was some blocking of the chamber, and the crystals of hematin were precipitated in the substantia propria of the cornea. Eventually the condition always cleared up.

Exceptionally high hypermetropia

MR. F. A. WILLIAMSON-NOBLE showed a woman who was wearing plus twenty spheres (prescribed by somebody else), though she could see better with plus eighteen. With the glasses her vision was, right 6/60, left 6/24. She had cerebellar signs, and was therefore taken into a nerve hospital. She would be kept for a time to see whether any change occurred.

Senile form of Coats's disease, with exudative retinitis

Mr. Mayou said this was really an osteitis deformans. There was calcareous degeneration of the arteries.

Penetrating injury of lens changing refraction, with good vision

MR. A. H. LEVY described the case of a man aged thirty-nine years, who while skiing in Switzerland last January had stumbled and pitched forward, his right glass impinging on the top of his skiing stick, breaking the lens. Some of the fragments of glass were driven into the eye, cutting the cornea, nicking the pupillary edge of the iris, and cutting the anterior capsule of the lens. The local doctor gave him some boric acid bathing and kept him in bed eight days with the eye bandaged. After that he was allowed to return home to England. When Mr. Levy saw him, ten days after the accident, the eye was quiet and white, though the anterior chamber contained a fair amount of lens matter. Lens substance could be seen protruding from the cut in the lens. The tension was normal, and there was no complaint of discomfort. Vision in that eye

was a bare 6/60, with pinhole 6/12. The speaker expected the lens either to be absorbed or to become quite opaque, but neither occurred. The masses of lens matter in the anterior chamber vanished in about a month; the wound in the lens capsule closed up, leaving the point of injury in the lens opaque. Then the vision with a pinhole was 6/9 partly. Two weeks later vision with plus 2.25 sphere equalled 6/12, and eight weeks after the accident with plus 1.75 sphere vision equalled 6/9. Three months after the mishap with plus sphere vision equalled 6/6 partly. During all this time the eye was kept under atropin, but at the end of March this was discontinued, and the accommodative power could be measured. The patient took 6.00 D. in the left (the uninjured) eye, —2.00 D. in the right. Six months after the accident, the vision in the right eye with plus 1.00 sphere plus 0.25 cyl. ax. 80° equalled 6/6 partly; the amplitude of accommodation had risen to four diopeters, that of the left remaining at six diopeters.

Before the accident the right eye was myopic 3.75 D., and after it he was one diopter hypermetropic. The moral of the case was that in injuries of the lens it might be worth while to wait to see what nature would do before proceeding to operative measures.

Discussion. MISS MANN asked whether the healing of wounds in the lens capsule was the usual course in certain animals. In some experiments she had done on rabbits' eyes with the object of producing cataract, needling of the lenses in three rabbits resulted in healing of the capsule each time.

MR. LEVY replied that in animals nothing short of the actual cautery seemed to prevent healing.

Some ocular manifestations of focal sepsis

MR. A. F. MACCALLAN read a paper in continuation of his previous contribution on the same subject. The

question was to determine whether a pathological state in any part of the body was commonly associated with ocular defects. This second series embraced fifty cases which attained full normal vision after correction of ametropia. There were lenticular opacities seen by ordinary focal illumination in twenty-six per cent, and in twelve per cent when seen by the slit lamp only; vitreous opacities seen with the slit lamp (including gross opacities) seventy-six per cent; macular hyperemia fourteen per cent; early pigmentary changes in the macula ten per cent. The abnormal bodily conditions found in these fifty cases were as follows:

	Percent
Tonsillar sepsis; operation	10
Chronic gonorrhea	2
Dental conditions:	
apical abscesses	10
chronic periodontitis	2
buried roots	4
obvious septic stumps	10
history of previous sepsis	36
bone infection	2

He said that a surprising number of patients who attained full vision after correction of the ametropia exhibited changes in the eye, the most marked of these being opacities in the lens and in the anterior part of the vitreous. The character of the lenticular opacity was that which Parsons termed cataracta senilis præmatura punctata. During the past year he had not seen a case of lenticular opacity, either in hospital or private practice, in which some focus of septic or toxic absorption could not be demonstrated, or in which there was not a history of some such focus. The site of the infection seemed to be immaterial. Professor Elliot-Smith had told him that there was a bare possibility that toxic material might pass up within the sheaths of the dental nerves to the Gasserian ganglion, and thence within the sheath of the ophthalmic division of the fifth nerve to any part of the eye.

Discussion. MR. C. BOWDLER HENRY, a dental surgeon, said two important questions arose in this connection: (1) Could the ophthalmic surgeon show that present sepsis was active in a particular patient? (2) Could such a record be taken, particularly in regard to vitreous opacity, that it could be compared with the condition a year or two afterward, in cases which were at first doubtful? Ninety-five per cent of the populace had defective teeth, and the great difficulty was to determine whether the sepsis was doing so much harm as to call for interference. He quoted cases in support of Mr. MacCallan's thesis, in one of which there was marked improvement in vision even following a preliminary scaling of the teeth.

THE PRESIDENT asked how soon after teeth had been removed could one feel safe about doing a cataract extraction.

MR. M. S. MAYOU said all ophthalmologists knew how serious dental sepsis was, and how common, and if looked for with the slit lamp opacities were common too. But it was not yet proved that the connection between the two conditions was as close as Mr. MacCallan postulated.

SIR ARNOLD LAWSON expressed much the same view, urging that every possible source of sepsis and other trouble should be investigated, not assuming that because the patient's teeth were defective that was the cause of the eye trouble. He mentioned a case in which, though the teeth were bad, the eye condition did not clear up until infection of the gall bladder had been put right.

(Reported by H. Dickinson)

PITTSBURGH OPHTHALMOLOGICAL SOCIETY

November 19, 1928

DR. E. B. HECKEL, president

Traumatic dislocation of lens and choroidal rupture

DR. J. G. LINN presented L.L., aged eight years, who had been hit

on the right eye by a stone, August 24, 1928. When seen one hour after injury there was marked palpebral swelling, with cuts in upper and lower lids parallel with the lid margins, marked hyphema, and a break in the epithelium. No intra-ocular details were perceptible. Atropin and bichloride ointment were used, and a leech applied to the temple. On September 1 the lens was dislocated down and back into the vitreous. On October 6 the vitreous was clearing. There were deposits in the macular region. The lens was freely movable backward but was anchored below. Slight choroidal rupture was noted near the macula.

Rupture of choroid

DR. J. G. LINN presented E.M., who had been hit on the left eye by a stone on July 24, 1928. Two days later some ecchymosis of the skin, marked hyphema, and injection of the eyeball were noted. No fundus details could be discerned. He was given atropin and dionin and hot compresses were ordered. By August 3 the hemorrhage was absorbed. The fundus showed much choroiditis on the temporal side and rupture of choroid below. On August 21 there were many red blood cells in the vitreous, the disc was pale, and on the nasal side were many small pigmented spots from the area above the disc down to below the disc, where the rupture started and extended around to the temporal side of the disc about one disc diameter from the disc. The area of pigment deposits and the actual rupture seemed to surround all but the upper part of the disc. Vision was 6/60, using the upper part of the retina.

Discussion. DR. G. CURRY reported a case similar to the above, from the kick of a horse.

DR. E. B. STIEREN said the usual choroidal rupture was vertical.

Foreign body in lens, removed

DR. E. B. HECKEL reported the case of C.H., aged nineteen years,

who appeared September 12, 1928, complaining of blurred vision in his left eye. Being a plumber's apprentice, he had had foreign bodies in his eyes on numerous occasions, but could not recollect any accident to which his failing vision could be attributed. He frequently cut pipe with a chisel, and it was probable that the injury to his eye was due to this cause. The left lens presented a diffuse cloudiness, mainly in the upper outer third, in the center of which a minute black particle was seen. X-ray localization was negative. However, with the giant magnet, and under loupe observation, the particle could be seen to move forward, but it could not be drawn into the anterior chamber.

A small opening in the capsule was made with a Ziegler knife, Lancaster's magnet was applied to the surface of the cornea, and the foreign body was drawn into the anterior chamber and coaxed to the bottom. Eserine was instilled, and after twenty minutes the foreign body was removed by the magnet tip through a corneal section below. The eye had remained quiet and the cataract, which had become complete, was now absorbing.

Removal of foreign body from choroid

DR. E. B. STIEREN reported the case of M.S., aged forty years, referred by Dr. J. W. McKennan with a history of having received a foreign body in his right eye two days before. A large subconjunctival hemorrhage covered the lower inner portion of the globe. The pupil was fully dilated with atropin, the lens and media clear. In the lower inner portion of the choroid could be seen a discreet hemorrhage, in the lower part of which a dark linear object appeared. X-ray localized a foreign body in this neighborhood.

Under a sliding conjunctival flap a T-shaped incision was made between the inferior and internal recti, and the foreign body was removed on first contact with the conical tip. The eye remained quiet and it was

interesting to observe the subretinal hemorrhage absorb, and the sclera finally show the initial lesion. Ten days after discharge from the hospital the eye was absolutely quiet, with normal vision.

Simple glaucoma

DR. A. KREBS reported the case of I.M.R., male, aged thirty-three years. He was first seen March 13, 1909. The vision of the right eye was 7/36. The left eye had been injured in 1887, having been struck by a stone. After being under observation for a month, irritation appeared in the right eye and the left eye was enucleated. The vision of the right eye was normal at that time with its correction, —1.50 sph. —0.25 cyl. ax. 90°. The cornea of the right eye had a small patch of pigment on the endothelium just below its center. With the pupil widely dilated two striæ were seen in the lens, one at the "eleven" and one at the "one o'clock" position. At the seven o'clock position in the periphery of the lens there was a reddish deposit surrounded by a few gray lines. The lens was otherwise clear; the vitreous was also clear, and the fundus showed nothing pathological unless a rather large physiological excavation could be so considered.

The patient was seen from time to time until March, 1912, when the condition was as before except that a few more fine lenticular striæ had developed. During this time the corrected vision remained normal, and there was no change in tension nor any disturbance in the visual fields. Homatropin cycloplegia had been used several times without any increase in tension. The patient was next seen by Dr. Clark of Columbus, who kept him under observation for one year. He had had no further attention until recently, when because of failing sight he consulted Dr. La Rue. The patient had a complete physical examination in 1926, at which time he was found to have infected tonsils and teeth. Both the

tonsils and the teeth had been removed since. He was seen on May 23, 1928, and stated that the vision had been getting gradually worse for the past year. The vision of the right eye was found to be 7/60, which could be improved to normal with -2.00 sph. -0.50 cyl. ax. 95°. Plus 2.00 sphere added for presbyopia enabled him to read Jaeger no. 1. Cornea, lens, and vitreous were found to be about as when seen sixteen years ago. The fundus also was the same except that there was more excavation of the optic disc. The visual field was contracted to four degrees above, three degrees nasally, four degrees below, and about fifteen degrees temporally. The tension was found to be 51 mm. Miotic drops were prescribed and he was instructed to report regularly for further examination.

J. G. LINN
Secretary

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

November 20, 1928

DR. W. HOLBROOK LOWELL presiding

Congenital absence of abduction

DR. BENJAMIN SACHS presented a twenty-nine year old man who had a congenital absence of abduction. The vision was 20/100 in each eye, improved to 20/30 with +1.00 sphere and -4.00 cylinder. The pupils, tension, and fundi were normal. There was an absence of binocular single vision. The patient used either eye and rotated the head to the right when using the right eye and to the left when using the left eye. He was unable to turn the eye beyond the mid line. Adduction was good. It was noticed that when the patient was made to rotate the eye nasally there would be a narrowing of the palpebral fissure but there was no visible retraction of the eye. A very interesting phenomenon was that when the patient was encouraged to

abduct both eyes would converge very strongly. Vertical motions seemed to be normal, and there was no nystagmus.

Use of contact glass in cases of keratoconus

DR. GEORGE S. DERBY called to the attention of members the possibility of using contact glasses in keratoconus. The first patient shown had a cauterization of the apex of the cone in the right eye in 1913. With a -12.00 cylinder she was able to read the 6/20 line with difficulty. With the contact glass alone she read 6/12 easily. Her left eye, using a -15.00 cylinder, read 5/60. With a contact glass combined with a +1.00 sphere she was able to read three letters of the 6/9 line.

The second patient, also a school teacher, had a right eye which had been useless for years. With the left eye, in 1928, with the appropriate correcting glass, she was able to see 6/9. The vision had sunk to 6/60, so that she was greatly handicapped in doing her work. In the right eye, with a contact glass and a +4.00 sphere, the vision improved to 6/12. In the left eye, with a contact glass combined with a -3.00 sphere, the vision equalled 6/9.

It was believed that each of these cases would be able to wear the contact glass which was to be ordered for her.

Do corneal scars move?

DR. BEN WITT KEY read a paper on this subject. The corneal scar which may shift its position in corneal substance is the newly formed scar or one recently cicatrized, of the slanting-cut variety or irregular laceration type (so-called linear scars), located in the superficial or deep substance of the cornea and involving the pupillary area just below the horizontal median line. Dr. Key cited cases indicating a shifting of the scar's position downward and toward the limbus after a period of one to four years. Measurements as to the

size and location of the scar in order to avoid errors in observation were noted in detail in the attempt to determine definitely this corneal change. The extent of this change he admitted to be very limited, not more than $1\frac{1}{2}$ to 2 millimeters, but when viewed in comparison with its area of location (the lower half of the pupillary area), it represents a change of some significance.

A brief review of the more recent studies as to wound healing and regeneration of the cornea, as to the formation of a corneal cicatrix, and as to the interpretation of these cellular changes was presented. An analysis of the physical and chemical influences which may explain the shifting of a scar's position was given. The speaker suggested that the anatomic structure of the cornea with its biochemic activity (demonstrated under the microscope and by experiment), its migratory cellular content, its fluid composition (about ninety per cent of its volume is water), might permit this change to occur in time through fibrous contraction, tissue tension, and pressure exerted by the lids, and possibly through functional stimulus induced by adjoining structures or by the action of sunlight.

Discussion. DR. VERHOEFF pointed out the uncertainty of taking measurements from the limbus, which has a tendency to creep in.

Measured correction of squint by combined technique

DR. W. HOLBROOK LOWELL then read the paper on this subject which is published in full in this issue of the Journal, page 173.

Discussion. DR. ALLEN GREENWOOD said although the operation could be done very satisfactorily without meas-

urements he had encouraged Dr. Lowell in working out the measurements and felt that the results were more exact. In doing any advancement or in advancing a tuck, it must be remembered that, while the muscle might attach between the cornea and its original attachment, the pull was always from the place where the muscle adhered to the original insertion.

DR. DAVID W. WELLS took exception to the remarks with regard to the advanced muscle becoming adherent all the way back to the original insertion. He had had one opportunity for observing this, in which an insufficiently advanced muscle was picked up a second time, and firm attachment was found close to the cornea but did not extend back more than three millimeters. Since Dr. Lowell called his method a measured operation, Dr. Wells felt that the paper would have been very much more valuable and would help us to decide how well he was able to measure the amount of the tucking if he had given us a complete list of the cases operated on, with the amount of turning before and after operation.

DR. WALTER B. LANCASTER said that the tucking operation was a very good operation but that he preferred not to bury silk sutures.

DR. S. J. BEACH protested against the statement, sometimes made by operators not familiar with this technique, that it was only adapted to low grades of squint. He had found it uniformly satisfactory in the high degrees in patients whom he had referred to Dr. Lowell and those on whom he had operated himself.

S. JUDD BEACH,
Secretary

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LEARNING TO OPERATE

To each first year medical student comes the hope that he will become a great surgeon. At that time all surgeons are "great". Fortunately most of us fully recover from this incidence of adolescence before receiving a medical diploma. The few who do not recover furnish the class that has been spoken of with contempt as "operators not surgeons". One who had not outgrown the childish hope of getting into the operative spotlight came to a graduate school, explaining that he wanted to learn all about the "eye muscles". But when no hope was held out to him that he would be allowed to operate on patients for squint during his six weeks' course, he went to another city where he thought he would have better opportunities. This man had been in practice several years, but kept a slovenly dirty office, where a careful surgeon would not have opened a chalazion. He knew nothing of the factors on which success of muscle operations must depend; or of the physiologic

eye movements that might be permanently crippled by an inappropriate operation. But his mind was made up that he wanted to learn to operate. This attitude is not unknown among students preparing for ophthalmic practice, even those who have fairly bright minds and some basic preparation for special training.

A single experience may help the young, ambitious specialist to keep in the true path for professional progress. A young ophthalmologist, after six months in a surgical out-patient service and some rather intensive study of the eye and its diseases, did his first cataract extraction. He had never attempted the operation under supervision, and had never seen it done on a human being, except from the seats of an operative theater; where only the shoulders and assistants of the operator were visible. The venture was made after practice on enucleated animals' eyes, and after days of reading and thought about every step in the operation, and about every possible incident or complica-

tion that might occur in connection with it. It gave vision with which the patient, eighty-seven years old, traveled alone one thousand miles to join her relatives. It was a case to review with satisfaction; as compared with that of another young doctor whose first operation was removal of a cataract which popped out of the eye when the corneal incision was completed. The eye was lost, and the would-be operator never undertook to operate on another eye.

From this first operation was learned the lesson that the "experience" gained from any case depends directly on the amount and kind of thought and study that have been given to that particular case, before operating, while operating, and in its postoperative care. This lesson multiplied the value of all subsequent experience. No series of operations, done without careful thought and a sense of responsibility to the patient, however well they might be supervised or explained, could have the same value in developing surgical skill and judgment.

Indeed, the habit of doing operations without thought and the sense of responsibility for the patient's welfare is the most certain way for making surgical skill and judgment impossible. The more operations he does in that way the more dangerous does the operator become to his patient and to his own surgical reputation. No record for numbers can compensate for lack of the thought and of the conscientious effort to serve, that stimulate the surgeon to constant alertness and instant readiness to do what is best for the patient. Every operation done mechanically, with responsibility resting on some other individual, or on an institution, may be a real obstacle to learning from experience as well as a menace to the patient who is attracted by a reputation founded on a number of newspaper notices or on hospital statistics.

The man whose chief reputation rests on the number of patients he has "seen", or the number of opera-

tions he has done, is one to avoid. The student who would achieve surgical skill and judgment must avoid the danger of habits developed by repetition of his own inaccuracies and blunders, through lack of thought and study given to the individual condition and patient. It is sometimes said that "one must spoil a hatful of eyes to learn to operate". It is nearer the truth to say that one who has spoiled a "hatful of eyes" never will become a good operator. It is such a poor way of accomplishing the purpose, for the spoiling of eyes, even dead pigs' eyes, to gain mechanical accuracy and skill for ophthalmic operations is unnecessary and wasteful.

Mechanical skill and exactness are better acquired by drawing, painting, or even by smooth accurate writing. In such exercises the mistakes and inaccuracies are not so hastily thrown away as with the spoiled eyes. They remain to be looked at and studied, so that the faulty movements that caused them may be corrected and overcome.

There is a popular superstition that an operator who has done an operation many times must be skillful at it. The superstition rests on the popular ignorance and inability of patients to judge of operations. Except as to the gentleness of his touch and the surgeon's general cleanliness, patients in the mass are entirely unable to judge of the skill with which an operation has been performed. They have no basis for realizing that the skill to operate depends on the conscientious thought the surgeon has given to every step in his procedure, rather than upon the number of times he has heedlessly repeated it.

Edward Jackson.

EYE LESIONS FROM NASOPHARYNGEAL TUMORS

Although numerous individual case reports are to be found in the literature, only a few large groups of cases

of malignant tumor of the nasopharynx have been reported. In July, 1921, New (of the Mayo Clinic) reported a group of forty-six cases. A year later he brought the number of cases up to seventy-nine, and in 1925, in a third report, he increased the total to 119. That such a large number of cases have been collected from one clinic in the short space of four years is evidence of the relative frequency of the condition.

These tumors are of great interest to the ophthalmologist because of the frequent involvement of the eye. Of New's first seventy-nine cases, the symptoms were referable to the eye in twenty-one. Among these seventy-nine patients, seventy-four operations had been performed for the relief of symptoms without recognition of the primary tumor in the nasopharynx. This illustrates the ease with which such tumors may be overlooked.

In the Archives of Otolaryngology (1929, volume 9, January, page 12), French K. Hansel reports twelve new cases from the Washington University clinic. The commonest eye sign is a paralysis of the sixth nerve. This is undoubtedly due to the exposed position of this nerve in the sphenoidal fissure. Extensive secondary growths are often noted while the original tumor is still of insignificant size and free from ulceration. Large masses in the cervical region have been found when the nasopharyngeal tumor itself was less than one centimeter in diameter. The fossa of Rosenmüller is almost invariably the seat of the primary tumor.

The second, third, fourth, fifth and sixth cranial nerves are often involved, the seventh rarely, as the growth must extend laterally to the region of the stylomastoid foramen to affect this nerve. The jugular foramen group of nerves, especially the ninth, tenth, eleventh and twelfth, are usually involved in mass. The eighth nerve is never attacked. Nasal symptoms are rare. Eighteen of twenty-five cases reported by Woltman showed paralysis of the sixth nerve. The first six

nerves are probably invaded by the primary tumor, whereas the remaining nerves are affected by metastases in the adjacent lymphatics.

Quoting from Hansel, the early signs and symptoms of these tumors are usually pain in the eye, the forehead, the side of the face, and the temporal region; toothache; earache, deafness, tinnitus, and a sense of fullness in the ear; diplopia, blindness, and proptosis; paresthesia of the face; enlarged cervical glands; dysphagia; aphonia and hoarseness; and distant metastases.

Unfortunately the primary tumor is seldom noted in time to prevent subsequent death from metastasis. Palliative treatment with radium is sometimes very helpful. The tumor is a sarcoma, a lymphosarcoma, or a carcinoma.

In view of the apparent frequency of nasopharyngeal tumors, abnormalities of the extraocular muscles which slowly increase in degree, as well as growths in the orbit, orbital pains, and retrobulbar neuritis, especially in association with other symptoms above mentioned, should be considered as possibly due to tumors of this kind.

Lawrence T. Post.

VEXATIONS OF REFRACTION WORK

Considering the number of people whose comfort and efficiency are involved, it is greatly to be regretted that attention is not more universally devoted to precision in refraction work. Unfortunately, there is much variation of opinion, even among the more expert, as to the proper basis for prescribing after the examination has been made. It is also true that no one, however expert, can be sure of a satisfactory result from every measurement of refractive error, and it is equally true that, after the most careful work, there is no accepted basis of prescribing which will please every patient, or which will even prove entirely satisfactory in every patient

who manifests a reasonable amount of perseverance in the sometimes rather slow process of adaptation to a new correction.

But, making some allowance for the differences of expert opinion, it can hardly be gainsaid that every refractionist, and especially every medical refractionist, ought to know how to ascertain the patient's full refractive error, as to the presence of hyperopia, myopia, or astigmatism, or any combination of these, even though his judgment may indicate some modification of this finding when writing the prescription. Yet it must be admitted frankly that, even among ophthalmic physicians, and even in the United States, there are very many who do not understand completely how to measure the exact amount and axis of astigmatism, although these are of critical importance; while there is often a good deal of looseness in the measurement of the total hyperopia.

Here, as in other departments of applied knowledge, much of the difficulty lies in defects of training. Too many refractionists grope their way to a very incomplete knowledge of the subject, whereas there is perhaps no field of medicine in which individual and personal teaching is so desirable and often so indispensable. But, if every medical refractionist could be given careful individual instruction by a capable teacher or teachers, there would still remain an important cause of inefficient workmanship. Although, as regards both doctor and patient, there is a more active and general interest in refraction on this side of the Atlantic than in some of the countries of Europe, many ophthalmic physicians in every country will be disposed to agree with Gjessing (of Drammen, Norway—see "Comparative estimations of refraction", *Acta Ophthalmologica*, 1928, volume 6, page 222) that "every ophthalmologist whose practice does not allow of his keeping an assistant will surely have discovered that measurements of refraction, especially as to astigmatism, are not

only time-consuming, but also wearisome". "The test card becomes in the course of years our worst enemy", Gjessing quotes a well known Scandinavian university professor as having once remarked to him.

This sense of weariness in doing refraction work is perhaps unavoidable to all of us as regards some of our more difficult and unsatisfactory patients, in whom precision seems at times well nigh impossible by any method. But it will be more uniformly present in the ophthalmologist who is so mentally constituted that the finer technique of refraction work has never appealed to him, who did not take up refraction work because he liked its mathematical quality, but because it was a necessary part of ophthalmology in his earlier years of practice, and a prerequisite to the gaining of the proverbial "bread and butter".

No one can hope to continue to do good refraction work, with a reasonable share of satisfaction and even pleasure in his daily occupation, who does not possess a fairly mathematical mind, who does not rather instinctively love precision for precision's sake, and who is not usually able to forget considerations of time and difficulty in the healthful mental exercise of working out an individual problem for the individual patient.

It is perhaps more typically European than American to remark, as Gjessing does in another part of his paper, that the fact that a weak cylinder may in many cases raise the visual acuity from six-sixths to six-fifths or even six-fourths "plays no rôle in daily practice", and that "the use of weak cylindrical glasses, which in the U.S.A. (United States of America) is so modern, is certainly in many cases entirely useless".

From the experience that many of us have had in producing striking relief by the exact measurement of low errors, especially where the two eyes are not exactly alike, one is led to believe that such remarks can only come from those whose estimation of these moderate astigmatic errors has

lacked precision as to strength and axis of astigmatism and as to the spherical balance between the two eyes. For a correction of moderate strength very commonly fails to give relief unless every component part of the prescription (spherical strength, cylinder strength, and cylinder axis) is worked out with precision.

It is this willingness to be satisfied with approximate estimation of refractive errors which is often responsible for resort to the use of certain much-advertised mechanical contrivances by which the patient more or less automatically becomes his own refractionist, and the examiner is merely required to read off the figures on a scale after adjusting a rack and pinion. If a half diopter of astigmatism is not worth correcting, it obviously does not matter if such contrivances are unreliable as to the influence of the patient's accommodation, or inexact as to axis in low astigmatic errors. (It is too often forgotten that, if the astigmatic axis is not arrived at rather closely, the measurement as to strength of cylinder is also likely to be inaccurate.)

Gjessing's comparative estimations dealt with the Snellen chart, the Thorner-Busch refractometer (based upon the sharpness of definition with which the fundus reflects a sharply outlined source of light contained within the apparatus), skiascopy, and Holth's kinesiography (a test performed with a stenopaic disc and a fixation object, somewhat along the same lines as the velonoskiagraphy of Trantas, described by Morsman in this Journal, 1928, June, page 433). Of the 780 eyes studied by Gjessing, all that showed a difference of less than one-half diopter as between the two principal meridians were considered as "nonastigmatic", and only those that showed a difference of three-fourths of a diopter or more were regarded as astigmatic. In this way the author groups his 780 eyes as 668 not astigmatic and 112 astigmatic!

Of the 112 eyes which the author called astigmatic only thirty-six gave

identical results by all four methods, and sixteen others showed by all four methods identical results as to one meridian only. The Thorner-Busch instrument gave insufficiently high hyperopia or excessively high myopia in fifty-eight eyes, and excessively high hyperopia or insufficient myopia in twenty-eight eyes; while extreme inaccuracies were recorded in a case of myopia of eighteen diopters. Kinesiography showed the same result as the Snellen chart in about a half of the eyes.

Gjessing concludes that in a great majority of cases the results found with these four methods did not vary by more than one-half diopter, and that these methods are therefore of approximately equal value in daily practice. Skiascopy he accepts as the quickest method, kinesiography as the method which comes closest to the results obtained with the Snellen test chart.

W. H. Crisp.

BOOK NOTICES

The eye. C. W. Rutherford, M.D., F.A.C.S. Octavo, 410 pages, 305 illustrations, 12 colored plates. New York and London, D. Appleton and Company, 1928. (See also A.J.O., 1928, v. 11, Dec., p. 1002.)

So long as there are communities that can support but one medical man, so long as general practitioners exist, they will need to know something of all branches of medicine and surgery. So long as the medical profession, the practitioners of the healing art, continue to constitute one profession, every member will need to know something of the work of all workers in the profession.

However completely any worker in medicine and surgery may specialize in his field of practice, he will still need to know something of what can be done in other fields of practice. Without such knowledge no specialist can bring to his patients the resources

of modern medicine. Every medical student must study all branches of medicine to give the service he undertakes to give; or to know when to supplement his own knowledge by indicating where he and his patient may still seek further help.

In view of this situation, books that undertake to give all members of the profession a knowledge of a special branch of the medical art are of great importance. This book undertakes to introduce medical men to ophthalmology as now developed. The first sentence of the author's preface reads: "The needs of the general practitioner and student of medicine have had first consideration in the preparation of this text"; and the book justifies this claim.

It is not only in the text that these needs have been considered. The ten-page table of contents is a guide to the facts that constitute modern ophthalmology, which every medical student or practitioner of medicine can afford to study with care. The twenty-four-page alphabetical index makes it a work of reference that gives access to the resources of this specialty. Its illustrations speak the universal picture language, and make the facts clear to the widest circle of medical readers. It is a book that undertakes to do a great thing and does it.

It might be criticized for giving more of ophthalmology than is generally expected in books of this class. It does give more than serves the immediate needs of the medical student. But there is an advantage in having become familiar as a student with a book which can in future years be used as a work of reference. The thirty pages given to the surgical treatment of diseases and deformities of the lids, with over fifty illustrations showing different operations, might include all that an ophthalmologist knows of the subject. But any practitioner may be called to cases of injury to the lid, and the emergency treatment is very important for the prevention of deformities. To understand this importance and the princi-

ples of such treatment may be very valuable and serviceable in securing a good result.

Failure to give enough space to certain subjects might be assumed from a glance at the chapters on the ophthalmoscope and ophthalmoscopy and on visual fields and blind spots. The assumption loses its importance when we look at the large number of references to these subjects in other chapters, as shown in the index. They are subjects of greatest interest to those who are preparing for ophthalmic practice; but ophthalmoscopy is also an important method of studying general pathology, and the visual field offers a variety of symptoms in diseases of the central nervous system, that should be known to the general practitioner.

The illustrations in this book are worthy of high praise. They compare favorably with those of any book of the same class published in Europe. They are appropriate, clear, even artistic; and each makes its point or tells the story as it could not be told by the text of a much larger work. Colored plates may be of more use to the medical student or the general practitioner than they would be to the worker who was daily looking at stained sections, or at the interior of the eye with the ophthalmoscope. As a new book worth looking over for himself, or worth calling to the attention of brother practitioners in other branches of medicine, "The eye", by Rutherford, deserves to be brought to the notice of each special worker in ophthalmology. *Edward Jackson.*

The Practical Medicine Series; the Eye, Ear, Nose and Throat. Edited by Charles P. Small, M.D., Albert H. Andrews, M.D., and George E. Shambaugh, M.D. Series 1928, Chicago, the Year Book Publishers.

The reviewer mentions this volume of the "Practical Medicine Series"

with the usual satisfaction at seeing a work well done, a useful selection of articles from the literature of the preceding year.

When one reads the abstracts and the editorial comments on the selected articles, it is hardly necessary to refer to the originals, because these selections are quite in the language of the original authors, and are fuller than in the usual abstract. This year, it is to be noted that the majority of the articles quoted were originally published in English and are mostly American. Is it possible that the editors have not had the usual access to French and German literature?

The book begins with a homily by editor Andrews upon the relation of the ophthalmologist to the general medical profession; warning the specialist that the closer the touch maintained with all other branches of medicine, the greater the service to the profession and to humanity.

Among these selections are to be noted a few outstanding essays. The one on health examinations of the eye comments on what has been done in school children, railway and marine employees, industrial and governmental services, and insurance examinations. Improvements are suggested, and recommendations are made for adult eye examinations, particularly for encephalic women and in middle age of both sexes.

Refractive examination in the very young, during the preschool age, is advised by Hazelton for all children and is also demanded by Lawrence Post. The present writer knows from his own experience of forty years how seldom he operates on cross-eyed children, in proportion to many others, and that in his hands nine out of ten such cases depart with straight eyes and with binocular vision if they are seen early in life. Post says: "Start the treatment of strabismus as soon as deviation is noted and you can safely promise much; but wait a few years and you can safely promise nothing". Otto Wolfe states that if

we are to obtain more than a cosmetic result we must develop some degree of binocular fusion. He gives some remarkable cases of its development and of improvement in vision of the squinting eye in adult life after operation and refractive correction, by use of the Worth amblyoscope and the Wells system of stereoscopic exercises. Hazelton gives partial correction of hyperopia for distance and full correction for near, in these cases in young children. Cowley regards the practical question as not how much hyperopia is present but how much of it must we correct to relieve the ciliary muscle and give comfort.

Taliaferro Clark finds that there is more trachoma in the 300,000 Indians in the United States than there was in 1913, that about 30,000 have the disease, and that these are largely scattered among the white resident population and have caused a spread of trachoma among them. Noguchi, before his death, isolated a micro-organism and caused the disease in monkeys by inoculation.

Considerable space is given to the lacrimal apparatus and its nasal treatment. The surgical relief of dacryocystitis and epiphora by the Dupuy-Dutemps and Bourguet intranasal operation is recommended as the best cure by Corbett and also by the editor.

The pupil in diagnosis also receives generous space. The treatment of cataract with lens antigen, is announced by A. E. Davis as a preventative and cure without resort to surgery, but so far he seems the only enthusiast to take the risk of its recommendation. The present writer can not see the *raison d'être*, and has seen some of the failures. The closing of cataract wounds by sutures is gaining in favor among the best known operators. Optic atrophy is discussed in several articles (without benefit to the patient), as is the nonoperative treatment of glaucoma with miotics. A few therapeutic remedies and new instruments are described.

Considerably more space is given this year to the ear, nose, and throat section; but this department is mostly devoted to clinical subjects, with nothing particularly new except the report on sodium nitrite therapy in seasickness, for which one hundred per cent of cures are claimed by Percy and Hayden. Cartilage and ivory implants in plastic surgery of the nose are recommended by Salinger. Diathermy is now a recognized form of treatment in the ear, nose, and throat. Bronchoscopy and esophagoscopy are now a specialty within a specialty, and a number of surgeons are following in Chevalier Jackson's footsteps.

Harry Vanderbilt Würdemann.

Section on Ophthalmology, American Medical Association, 1928, Transactions. Cloth, octavo, 442 pages, illustrated. Chicago, American Medical Association Press, 1928.

In the scientific importance of the papers published in it, this volume is exceptional, even in this series of transactions. Among the papers that make it so may be mentioned those on periodic ophthalmia and its relation to uveitis in man, by E. C. Rosenow and F. Park Lewis; the light sense in early glaucoma, by George S. Derby and his associates; ocular measurements, by Adelbert Ames and Gordon H. Gliddon; nature and pathogenesis of angioid streaks in the ocular fundus, by F. H. Verhoeff.

The larger part of the papers are more directly practical, as those on the following subjects: ocular signs in cases of goiter, postoperative cataract infections and allied subjects (four papers) nonspecific protein therapy, and meningiomas arising from the tubercle of the sella turcica. The last paper introduces to us a new condition, to be dealt with by surgery; but the neurosurgeon must rely for guidance in it on the ocular symptoms; and the ophthalmologist needs to prepare to give the needed practical assistance, in preventing the blindness

in which the malady tends to terminate.

An omission which will be noted with regret is the discontinuance of the list of members of the Section. This list was about the most convenient and complete directory we had to the wideawake, progressive workers in ophthalmology, distributed throughout the country. The list of those certified by the American Board for Ophthalmic Examinations will come nearest to taking its place for the reference of patients going to distant parts of the country.

Edward Jackson.

Bulletins et Mémoires de la Société Française d'Ophthalmologie. 1928, Paris, Masson et Cie., 120 Boulevard Saint-Germain.

The volume consists of about 450 pages devoted mainly to the papers, reports, and discussions of the annual sessions of the French society. Among the important papers presented are the following: multiple sources of aqueous humor, by Magitot; dilating mechanism of the iris, by Redslob; color theories of W. Ostwald, by Dufour; experimental tuberculosis of the cornea, by Carrère; treatment of sympathetic ophthalmia, by Villard; and results of the medical treatment of glaucoma after one year's trial, by Abadie. The members of the society deceased during the year, Darier, Fromaget, Gurszun, Giraud, Lagrange, Landolt, Léonard, Maucione, and Namur, have short biographical notices. The special report for the 1929 meeting is to have as subject the etiology and treatment of the blepharitis, to be presented by Aubaret. That for 1930 is to deal with biomicroscopy of the crystalline lens in its normal and pathological states, to be given by Duverger and Velter. The remainder of the volume is occupied by the Society's by-laws, and by lists of officers, foreign delegates, honorary members, and members.

Phillips Thygeson.

The etiology of trachoma. Hideyo Noguchi, M.D. Paper, octavo, 54 pages, 31 plates, 5 in colors. New York, the Rockefeller Institute for Medical Research, 1928.

This monograph is published as supplement number 2 to the Journal of Experimental Medicine. It is issued free to subscribers to that journal, and separate copies may be obtained for two dollars. It now presents almost the last finished piece of research by Noguchi, who left New York for Accra on the Gold Coast of Africa on October 22, 1927, and died there; the last examination for this research being made May 25, 1928. It may well be Noguchi's most significant memorial, and those who heard him present verbally the results of his investigations before the Section on Ophthalmology of the American Medical Association, May, 1927, will most eagerly welcome this permanent record of a fundamental advance in this difficult field of ophthalmic research.

The book is divided into four parts, and the first begins with the statement that "the incitant of trachoma is still unestablished". This was certainly true when Noguchi began his investigations in 1926. His material was obtained from five well advanced, untreated cases, that presented the disease when entering the Indian School at Albuquerque, New Mexico. In four of the cases he found a gram-negative, motile bacillus for which he proposed the name *Bacterium granulosis*. With pure cultures of this organism, injected into the subconjunctival tissue of several species of monkey, Noguchi produced lesions closely corresponding with those of human trachoma, and with those lesions produced by other observers who have inoculated monkeys with material obtained from human trachoma.

This form of granular conjunctivitis was then transmitted from animal to animal, until 18 rhesus monkeys, 1 Japanese monkey of closely related species, 2 chimpanzees, 2 baboons, and 1 orang-utan had been successfully

inoculated. This transmission had gone up to its fifth series, and the bacterium had been recovered from the lesions of the inoculated animals, and may be considered the inciting microorganism of trachoma in man.

The monograph is divided into four parts. The first deals with pathology, bacteriology, direct inoculation, and culture media. The second considers the experimental production of granular conjunctivitis. The animals used show different degree of susceptibility and resistance. When one eye is inoculated the other also becomes affected. But the disease ends in recovery, usually within three months. Some animals of the species seem immune. Part 3 takes up the experimental transmission of granular conjunctivitis from animal to animal. Part 4 gives a comparison of human and experimental lesions.

The plates add greatly to the value of the book. Those in black and white are reproductions of photographs of microscopic sections and of plate cultures. The color plates show the appearances of the experimental lesions. It must be admitted that by the researches recorded in this book a substantial advance has been made in our knowledge of the etiology of trachoma.

Edward Jackson.

Public Health Service of the United States, annual report of the Surgeon General for 1928. Cloth bound, 346 pages. United States Government Printing Office, Washington, 1928.

This annual volume of the Public Health Service contains a great deal of miscellaneous information, such as does not commonly meet the eye of physicians in private practice, with regard to governmental activities in the problems of health and disease. Thus the division of scientific research tells of experiments concerning the effect of very high frequency currents on tissue cells, as related to the problem of cancer; of studies as to the

incidence of goiter in various localities; of the activities of the leprosy investigation stations; of experiments in the control of malaria, both as to the destruction of the mosquito and as to the use of the new antimalarial drug plasmochine; and of numerous other important lines of research, including nutritional diseases, Rocky Mountain spotted fever, the epidemiology of trachoma, child hygiene, industrial hygiene, and stream pollution.

The wording of the report on the eradication of trachoma appears to indicate that further experiments are being carried on, along the lines initiated by Noguchi, in the transmission to monkeys of organisms isolated from human cases of the disease and successfully cultivated in the laboratory.

An interesting development of recent immigration laws is the system of medical examination of immigration applicants in their countries of origin. This was inaugurated experimentally in 1925, in Great Britain and in the Irish Free State, and has since been extended to Belgium, Denmark, Germany, Holland, Norway, Sweden, Czechoslovakia, and Italy. Out of 167,000 applicants for immigration visas, thus examined abroad by our medical officers, nearly 8,000 were excluded for medical reasons; and is satisfactory to note that of 159,283 who had been passed in a preliminary medical examination abroad and to whom visas had been issued only a total of seventeen were finally certified for mandatory deportation upon arrival at a United States port, on the ground of being afflicted with "class A diseases."

W. H. Crisp.

The modern treatment of binocular imbalances with the genothalamic kratometer. R. M. Peckham, Opt. D., with a foreword by E. LeRoy Ryer, Opt. D. Shur-on Standard Optical Company, Inc., Geneva, New York, 1928. Price \$2.00.

One must suppose that this book has had readers, for this is its second edition. Why it should be read is more difficult to understand, for it is pseudoscientific, a mixed jumble of statements without logical arrangement. It will hardly appeal to ophthalmologists of scientific training. While the apparatus which it recommends may have real virtues, they are not elucidated by this book.

The following quotations may suggest a little of the author's point of view: Says the foreword: "For more than thirty years I steeped myself in and became saturated with the muscular imbalance philosophy of Worth, Maddox, Valk, Savage, Landolt, Eberhardt, Kletzky, Howe, Stevens, Ranney, Gould and a host of others with whom you, too, are just as familiar—great philosophers all but not a real physiologist or neurologist in the lot." Again from the foreword: "Optometry and Ophthalmology alike have done all too little original work, let us, therefore, evaluate fairly and stand squarely behind this of Peckham." ". . . to uncover and remove the cause of muscular imbalances and to achieve comfortable Binocular Balance. . . . The instrument, and the only instrument, that enables us to do this work is the Genothalamic Kratometer." "One of the most troublesome symptoms arising in the course of such diseases as high blood pressure, toxic infections from diseased sinuses, tonsils, teeth, etc. is the loss of associated control of muscles that are normally synergistically innervated."

W. H. Crisp.

CORRESPONDENCE

Effects of miotics in normal eye

To the editor: Does the use of a miotic reduce the tension of a normal eye?

When a case with borderline tension is encountered I frequently prescribe pilocarpin 0.5 or 1 per cent t.i.d., for a few days, and then measure the tension again. If it is found

to be definitely reduced I conclude that a glaucomatous tendency exists, even though other symptoms of glaucoma are lacking.

This raises the question of the effect of a miotic on the tension of the normal eye. A somewhat hasty search of the literature has revealed but one report, and this was the use of one per cent eserine in six cases which showed "a transitory increase shortly after instillation, not due to the simultaneously appearing miosis, but very probably due to spasm of external ocular muscles".

What we need to know is the effect of a miosis produced with the customary strength of the drug, as it is quite possible that one per cent eserine might excite other symptoms which would mask the picture.

Dr. William MacLean (of tonometer fame) agrees with me on the importance of the investigation and is to undertake it.

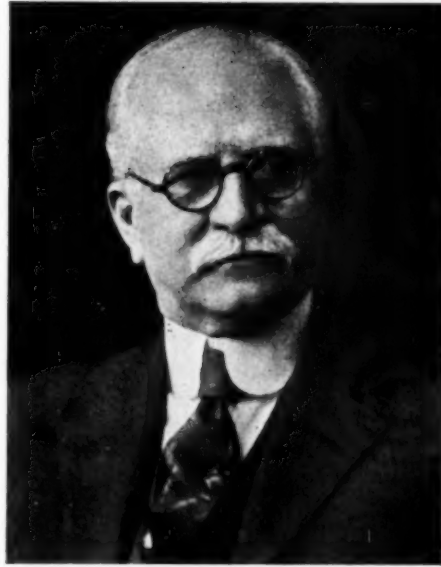
In the meantime I should like very much to hear from anyone who has some data on the subject.

David W. Wells.

Hotel Westminster, Boston

Three years of this training was followed by two years at the "Koenigliche Christian-Albrechts" university, Kiel, Germany, after which he returned to Saint Louis and associated himself with Drs. Green and Post.

He was associated with the eye department of Washington University throughout his life, assuming the professorial chair in 1902, and being active in the development of ophthalmology in the school until his retire-



Arthur Eugene Ewing, 1855-1929

OBITUARIES

Arthur Eugene Ewing

Dr. Lawrence T. Post writes:

Dr. Arthur Eugene Ewing was born in Cartersville, Georgia, on April 6, 1855. His father was a sturdy example of the family physician in a scattered community: of a rugged constitution, he defied old age, practicing actively until well beyond four score years. The son was graduated from Dartmouth in 1878, and was admitted to the Alabama bar in 1879. A very brief practice of law convinced him that the legal calling held no appeal for him, so he began the study of medicine and he was graduated from the Saint Louis Medical College in 1883.

He then accepted the opportunity of entering the office of Dr. John Green.

ment in 1921, to become professor emeritus. Of the many honors given him suffice it to mention that he was a member of each of the national ophthalmic societies; held the office of vice-president of the section on ophthalmology of the American Medical Association; and received the degree of master of arts from Washington university in 1912 and that of doctor of science from the same university in 1926. On January 23, 1929, he was taken ill with a cerebral hemorrhage, and he died three days later.

Fourteen years of daily contact with such a man makes a great impression on one's life. So much might be told about him; for so little can space be found. The spirit of youth was his

most impressive characteristic. Pink cheeks and a shy boyish smile with a merry twinkle in the eye gave him an appearance singularly free from the usual invasions of age. Though he had stored up much knowledge in the forty-five years of very busy practice he was ever willing to learn and always seeking to find out some new thing.

He insisted on there being a laboratory connected with his office and if ever there was a slack day he would get out his specimens and work on them.

The young men trained in his office were urged to make investigations and to present their studies before the medical societies.

His relation to his patients was a beautiful one, for he was greatly loved not only because of the help that he gave them but for his kindness toward them. To many he was more like the family physician than the ophthalmologist. Never would he deceive a patient with impossible hopes, but he understood the vital importance of the cheerful outlook.

No realization of death drawing near reached him. Only a week before his death, half jokingly but half seriously, he said he thought he might well practice for another twenty-five years. Until he was stricken there never was a steadier hand for operations, and few if any have left a better record of successes.

At the time of onset of his mortal illness, upon the instigation of his confrères he was considering the completion of a book on his many contributions to ophthalmology. Among these contributions should be mentioned his publications on optotypes of various kinds and on the many instruments he invented, including capsule forceps, double fixation forceps, lid speculum, and expression forceps for trachoma. To one who watched his work for many years his remarkable achievements seemed due more to meticulous attention to detail than to radical procedures. He fully appreciated the fine points which determined the

difference between success and failure.

He recognized the absence of great ophthalmologic discoveries during his life span, and felt that much of the future progress in the specialty must come from the laboratory. Included in his dreams for his old age was a return to research to undertake original studies, and it was this indomitable and searching spirit that inspired those about him.

Wise, tolerant, kindly, his was a noble figure in the profession. He leaves a vacancy in the hearts of his friends and associates that can not be filled, but it is hoped that his teaching and spirit will bear fruit increasingly in the years to come.

Hubert Sattler

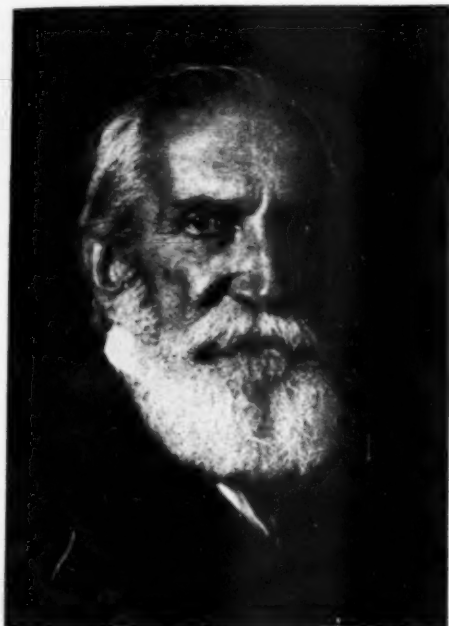
(Abbreviated from an obituary by Professor Birch-Hirschfeld, *Klinische Monatsblätter für Augenheilkunde*, 1928, volume 81, December, page 857.)

Hubert Sattler, emeritus professor of ophthalmology in Leipzig, died in that city on November 15, 1928, in his eighty-fifth year. He was born September 9, 1844, in Salzburg, Austria. His father was a painter, creator of the Sattler panorama which is still displayed in Salzburg. From him the son acquired his skill in drawing and his joy in products of the plastic arts.

At the age of twenty-eight years Sattler became assistant to Ferdinand Arlt in Vienna, after having spent some time with Billroth at the surgical clinic. He became privatdozent in 1876, in the following year was called as professor to Giessen, two years later to Erlangen, and seven years later still to Prague. In 1891, he succeeded Coccia at the University of Leipzig, where he remained as director of the University eye clinic and as emeritus professor until his death.

For decades the clinic which he conducted was one of the leading centers for ophthalmologic training in Ger-

many, and from it went forth many valuable scientific works and many excellent ophthalmologists, among them five teachers at German or Austrian universities. Among other honors, Sattler became president of the German Ophthalmological Society and joint editor of Graefe's Archiv für Ophthalmologie.



Hubert Sattler (Leipzig), 1844-1928

Sattler was outstanding as an operator. It was a pleasure to see him do the most difficult operations on the eyeball, with unexcelled ease and certainty. In spite of his temperamental, occasionally irritable nature, which was capable of inspiring fear in students and examinees, especially those who took their studies too lightly, the writer never saw his hand tremble during the most difficult operation upon the most trying of patients.

Whoever had the good fortune to know Hubert Sattler more closely as a man could not fail to be enchanted by the freshness and naturalness of his character, which he preserved to his latest years. He was a true master

of the art of living. Plain and unassuming as to his own person, he was receptive to everything fine that art and nature had to offer. How he enjoyed masterpieces of music and of plastic art, he who knew every good picture, whether it hung in an Italian castle, or in a museum of Germany, Holland, or England! How sensitive he was to the beauties of nature, especially when in bodily vigor he wandered through his beloved mountains, he who knew intimately every flower.

That he was kindly, sympathetic, a faithful friend, a physician in the best sense, is known to everyone that was in close relationship with him—his friends, his pupils, and his patients, to whom he gave much and who with him have lost much.

His was a personality of unusual gifts and extraordinary alertness and productivity. He demanded much of his pupils, but still more of himself. He was inspired in behalf of the branch of medicine which he represented, its scientific basis, and its practical activity. In his small, simple workroom in the old Leipzig clinic he spent evening after evening at his beloved microscope, adding to his knowledge of the normal and pathologic anatomy of the eye, his mastery of which was equalled by few others. His interest was by no means limited to our specialty, but reached out into all branches of medical science, whose relation to ophthalmology he followed indefatigably. Whoever carefully studies his book, published in 1926, on malignant tumors will hardly consider it possible that this should come from the pen of a man of eighty-three years.

His strictly scientific tendency had a strong influence on Sattler's clinical activities. Every individual case was for him an object of scientific inquiry, which stimulated him to the most careful and scientifically thorough investigation. It was this unity of science and practice which inspired the most profound respect in his pupils.

John Monroe Banister

Dr. H. B. Lemere writes: Dr. J. M. Banister of Omaha, died, January 31, 1929, aged seventy-four years.

He was born at Greensboro, Alabama, the son of an Episcopal minister. In 1874 he graduated from Washington and Lee university. He then attended the University of Virginia medical college, and received his degree in 1878. He entered the medical corps of the United States Army in 1879, and served with distinction until his retirement, after over thirty years service, in 1910. During this service he developed his knowledge of ophthalmology by studying in New York and Philadelphia.

While stationed at Fort Leavenworth he carried out a series of tests on healthy soldiers which established a new standard in regard to the dynamics of coordinated eye movements. When in command of the hospital at West Point he modernized the operating room and used his operative skill to give the cadets the benefit of skilled modern surgery. In the Philippines, while in command of the Department of Luzon and later of the First Reserve hospital, he met the problems of tropical medicine fearlessly and successfully. Wherever he served, he fulfilled his duties with intelligence, courtesy, skill, and courage.

He was president of the Nebraska State medical society in 1919.

ABSTRACT DEPARTMENT

Abstracts will be classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

- | | |
|--------------------------------------------------------|-----------------------------------------------|
| 1. General methods of diagnosis | 9. Crystalline lens |
| 2. Therapeutics and operations | 10. Retina and vitreous |
| 3. Physiologic optics, refraction, and color vision | 11. Optic nerve and toxic amblyopias |
| 4. Ocular movements | 12. Visual tracts and centers |
| 5. Conjunctiva | 13. Eyeball and orbit |
| 6. Cornea and sclera | 14. Eyelids and lacrimal apparatus |
| 7. Uveal tract, sympathetic disease, and aqueous humor | 15. Tumors |
| 8. Glaucoma and ocular tension | 16. Injuries |
| | 17. Systemic diseases, including parasites |
| | 18. Hygiene, sociology, education and history |

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Kreutzfeld. **Contributions to hypopyon iritis.** Zeit. f. Augenh., 1928, v. 66, Oct., p. 243.

Case 1: A particularly severe iritis, undoubtedly syphilitic, with a most copious hypopyon, cleared up after treatment with inunctions, but recurred three times on discontinuance of the inunctions, despite salvarsan treatment. Each recurrence presented the same picture of violent inflammation. After roentgen radiation of the eyeball was combined with inunctions no further recurrences were noted, and the patient has been well for two and one-half years. No synechiæ remained, and lens capsule, Descemet's membrane, vitreous, and eye-grounds were normal. Igersheimer is quoted as stating that hypopyon is rare in syphilitic iritis.

Case 2: A four-year-old boy had unilateral iritis with lumpy post-corneal deposits and hypopyon, as well as a striking swelling of the iris interpreted as an hematogenous abscess, which was probably the source of the iritis. After one milk injection the eye healed with only one synechia at the site of the swelling.

Some time after, the patient had a typical dendritic keratitis, which suggests that the iritis too had been herpetic.

Case 3: A uniform clouding of the aqueous, sufficiently dense to obscure iris structures, resulting from infection of an eye during a cataract operation.

The characteristic feature of hypopyon with iritis is the inconstancy of its occurrence, in contradistinction to that characteristic etiological and clinical entity, hypopyon keratitis.

Hypopyon iritis merely describes the accidental occurrence of visible pus for reasons which are as yet unknown. Recurrent hypopyon as a clinical entity is only a variant of hypopyon iritis, and a critical survey of the literature does not justify calling this manifestation a clinical entity. Gilbert's septic iridocyclitis, a bilateral iritis with recurrent hypopyon, chronic course, and unfavorable outcome, and in association with septic-rheumatic skin and joint disturbances, may be a clinical entity, but one can not class with these the not uncommon benign unilateral form of hypopyon which may recur a few times.

If we now consider all spontaneous

uveitis as a manifestation of a cryptogenic general disease and the site of metastasis as a result of anatomical relationship or chance, we may not consider pyogenic iridocyclitis as a transitional form between simple iritis and acute metastatic ophthalmitis. Gilbert believes hypopyon iritis to be a slowly progressing chronic form of metastatic ophthalmia which he calls ophthalmia lenta, a conception which he applied to streptococcus sepsis and certain cases of ciliary body tuberculosis and pseudoglioma in the child. Krückmann on the other hand feels that the classification of iritis can and should be based on etiological considerations, and Kreutzfeld agrees with this viewpoint.

F. H. Haessler.

Larsen, H. **Use of atropin in glaucomatous iridocyclitis.** *Oftal. Selskab i København's Forhandling*, 1928, pp. 44-48.

Two cases are presented in which the leading symptom was high tension and in which recovery followed the use of atropin. The first patient was a man of sixty-four years who gave a history of pain and gradual reduction of vision in the right eye for twelve days; he had been treated with eserine for five days. Examination showed: tension 50 mm. (Schiotz); cloudy cornea; precipitates on posterior surface of cornea; ciliary injection; visible blood vessels in iris; pupil contracted; and numerous posterior synechiae. Atropin three times daily was ordered. On the following day the tension had fallen to 16 mm. and from that time on the patient made a rapid recovery without any further rise of tension above normal. The other patient was a girl of seventeen years who had had pain and dimness of vision in the left eye for one month. She presented a tension of about 60 mm., cloudiness of the cornea, a few scattered precipitates on the posterior surface of the cornea, slight ciliary injection, the pupil semidilated, and no synechiae. She also was put on atropin and the tension

came down to normal after six days. The author believes that the increased tension in these cases is due to increased secretion of aqueous from the ciliary body, and that the atropin reduces the secretion of aqueous by putting the ciliary body completely at rest. He suggests that atropin should not be used timidly but in large amounts in order to secure complete paralysis of accommodation as quickly as possible.

D. L. Tilderquist.

Lerner, M. L. **Gonorrheal iritis.** *New York State Jour. of Med.*, 1928, Oct. 15, p. 2025.

Although some authors maintain that from eight to twenty per cent of all cases of iritis are due to gonorrhea, the writer feels that this percentage is too high. He does emphasize, however, the necessity in all cases of iritis of a painstaking search for old gonorrhea, for such an etiologic factor can cause ocular inflammation even twenty years after the initial infection. The gonococcus has certainly been recovered from the posterior genitourinary organs of the male after a lapse of twenty-seven years. Cases are cited where the gonorrheal history dated 4, 5, 9, 10, 12, 13, 14 years previously.

D. H. O'Rourke.

Verhoeff, F. H. **Histological observations of localized tuberculous chorioretinitis.** *Arch. of Ophth.*, 1929, v. 1, Jan., pp. 63-70.

Localized chorioretinitis appears first as a rounded or oval, almost white, slightly elevated area, with ill defined margins. In it the retinal vessels are usually obscured. The vessels about the lesion have constricted lumina and are covered by white mantles. Extravasations of blood may be present; smaller areas usually can be made out in the vicinity of the larger one. The vitreous is filled with fine opacities. Later, pericorneal injection, descemetitis, and even posterior synechiae occur. Gradually the vitreous opacities become more numerous and eventually there is left an atro-

phic, irregularly pigmented area. The primary focus of infection may lie anywhere in the fundus, frequently far forward toward the ciliary body. Occasionally, the retina may be detached. The disorder is usually not bilateral. Recurrences are common. In America, this type of choroiditis has generally been considered the result of focal infection. Healing takes place, as a rule, within a year. The author has recently had an opportunity of examining such a case microscopically. This examination showed the lesion to be tuberculous, with typical giant cells, epithelioid cells, etc. The author, therefore, assumes that all such lesions are tuberculous or syphilitic, rather than from focal infection. He calls attention to the fact that he has elsewhere submitted evidence to show that such lesions are produced by bacilli which first reach the aqueous and vitreous, from whence they are carried or deposited upon the various tissues later involved. In this case, however, the lesion was probably the result of direct metastasis, as the anterior portion of the eye was free from tuberculous foci. The iritis present, he states, was undoubtedly due to a toxin arising from the lesion in the fundus. The numerous minute tubercles scattered over the retina about the lesion were produced by macrophages derived from the primary focus and deposited on the retina from the vitreous. The tendency for epithelioid cells to accumulate about the retinal veins is noted and is held probably responsible for the usual occurrence of tubercles along the course of such veins. *M. H. Post.*

Young, C. A. **Syphilis of the eye.** *Virginia Med. Monthly*, 1928, v. 54, March, p. 785.

One case is reported illustrating the differential diagnosis of sympathetic ophthalmia from a type of luetic iridocyclitis. A young girl with marked iridocyclitis in the left eye gave a history of an injury of the

right eye one year previously, and an enucleation of the right eye a few weeks later. Not knowing who had enucleated the eye, the author opened the orbit to determine the presence of scleral and choroidal remnants. None were found. The Wassermann proved to be positive, and under proper treatment the left eye cleared rapidly. (Bibliography.)

George H. Stine.

8. GLAUCOMA AND OCULAR TENSION

Ackermann, E. **Effect of theophyllin on the permeability of the blood-aqueous boundary** (*Blutkammerwasser-Schrank*). *Arch. f. Augenh.*, 1928, v. 99, Nov., p. 611.

Ackermann, stimulated by the work of Franceschetti and Wieland, experimented with theophyllin in the human eye. He found that in the anterior chamber of the normal eye fluorescein disappeared in from twenty-five to ninety minutes. With the use of theophyllin there is a definite acceleration in its disappearance, which the author attributes to the increased permeability caused by the drug.

After theophyllin had been used, fluorescein remained in the anterior chamber longer than in the normal, untreated eye. This indicates that following theophyllin there is an increased albumin content in the anterior chamber, as shown in experiments on rabbits.

Frederick C. Cordes.

Dieter, W. **Determination of intraocular blood-pressure and its significance in investigations of the glaucoma problem.** *Arch. f. Augenh.*, 1928, v. 99, Nov., p. 678.

Dieter, using his previously described method, measured the intraocular blood-pressure of the capillaries in normal and glaucomatous eyes. In normal eyes, he found his results corresponded with those of Baumann. The intraocular tension depends upon the pressure of the intraocular capil-

laries and the colloid osmosis of the entire blood system. The cause of the increased intraocular tension of primary glaucoma is demonstrable in the increased pressure of the intraocular capillaries. The so-called "permeability changes" and the "impermeability" of old glaucomatous eyes are the changes that follow the primary normal circulatory disturbances. The changes are not the primary cause of the intraocular tension of glaucoma, but are a secondary additional factor. *Frederick C. Cordes.*

Dupuy, Jules. **Iridotaxis for glaucoma: comparison with other operative measures at Charity hospital.** *Southern Med. Jour.*, 1928, v. 21, April, p. 267.

Dupuy used the iridotaxis operation indiscriminately in about one hundred cases of glaucoma of all types in which surgery was thought necessary. He concludes that iridotaxis seems to give permanently beneficial results in a greater number of cases than any of the other operations for glaucoma. Postoperative complications were rare, and late infections have not been seen once in the four years of observation. The comparatively simple technique should also recommend it to the average operator. Three unsuccessful cases are briefly outlined. (Discussion.) *George H. Stine.*

Graefe, Albrecht. **Iridectomy in glaucoma. A study of the glaucomatous process.** (Translation.) *Arch. of Ophth.*, 1929, v. 1, Jan., pp. 71-86.

This famous paper, first published seventy-two years ago, has been translated and abstracted by Francis Heed Adler, as a fitting part of this first volume of the new *Archives of Ophthalmology*. Reading it in the light of the knowledge of the present day, one is amazed at the insight of the old master. Very little has been added to our knowledge with regard to the action of iridectomy in glaucoma since the writing of this paper. Probably the most noteworthy change of attitude is that concerning the

method by which an iridectomy accomplishes what it does toward the alleviation of intraocular tension. Graefe admitted that he did not understand exactly what took place, but suggested that it might be a reduction in the secretory function of the iris, due to the removal of a portion of that tissue, while today the evidence indicates that mechanical filtration through the scar of the operative wound is the true explanation of the efficiency of this operation.

M. H. Post.

Peter, L. C. **The comparative value of glaucoma operations.** *Trans. Pacific Coast Oto-Ophth. Soc.*, 1928, April, p. 80.

This paper is an excellent discussion of the technique, indications, and contraindications of the commoner operations used in glaucoma. In Peter's experience sclerocorneal trephining furnishes better and more enduring results than any other type of operation. Late infections average about 0.25 per cent. Iris inclusion has not yet proven its dependability and efficiency. Best results with iris inclusion were obtained in buphthalmos and in acute rise of tension after cataract extraction. (Discussion.)

George H. Stine.

9. CRYSTALLINE LENS

Greenwood, Allen. **Mental disturbances following operations for cataract.** *Jour. Amer. Med. Assoc.*, 1928, Dec. 1, p. 1713.

Some degree of mental instability may occur in from 2.5 to three per cent of all cases of cataract extraction. There seems to be an agreement in the belief that advanced age and the blindfolding of both eyes are the principal elements in the causes of these mental disturbances. Preventive measures both before and after operation are considered, and suitable treatment in case of failure of the prophylactic measures is discussed. The paper deals with the value of protective dressings to avoid

accidental injury, and many other decidedly practical suggestions.

D. H. O'Rourke.

Lundsgaard, K. K. K. Choroidal hemorrhage after cataract operations. *Acta Ophth.*, 1928, v. 6, no. 3, pp. 251-259.

Lundsgaard saw one expulsive hemorrhage in 1,200 cataract operations, and none following iridectomy. The case of expulsive hemorrhage is reported, and three others of severe choroidal hemorrhage without expulsion of the ocular contents are detailed. The first symptom of the latter group is almost always a sudden pain in the eye, and trauma is not the usual cause. Most of these cases do not occur in eyes otherwise healthy, but there is usually an old iridocyclitis or glaucoma. The use of a concentrated solution of adrenalin (with cocain) seem to predispose to this catastrophe. Suturing of the wound acts to prevent hemorrhage. Blood-pressure observations fail to prevent this unfortunate occurrence, which accounts for more lost eyes than infection.

E. M. Blake.

Moron Ruiz, Jose. Double capsulotomy. Posterior capsulotomy and extraction with forceps. *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, May, p. 273.

The author's method, which he applies to congenital cataracts in children, consists in transfixing the whole lens with the Graefe knife through to the vitreous, and pivoting the point of the knife forward before withdrawing it. He describes four cases treated in this way with perfect results. Post-operative reaction is very slight, and there are no vitreous changes nor hypertension. In the adults with traumatic cataract the author, after keratotomy, opens the capsule and then aspirates the lens substance with the Redard suction instrument. For immature cataracts he uses a corneal suture, and, after delivering the lens in the usual way, he cuts the posterior capsule with a knife needle bent at a suitable angle, moving the point

around like a watch hand. The cystotome must not be employed. The author claims that no loss of vitreous is to be feared, as the corneal suture closes the wound perfectly.

M. Uribe Troncoso.

O'Conner, Roderick. Cataract operations in diabetics: results in seventeen. *Trans. Pacific Coast Oto-Ophth. Soc.*, 1928, April, p. 92.

Seventeen cases are reported to demonstrate that there should be no hesitation in operating on cataracts in diabetics provided thorough precautions as to preliminary general examination, elimination of all foci of infection, reduction of urine and blood sugar, and prevention of infection are taken.

Needling was the operation of choice in six patients (eighteen to thirty-eight years of age), simple extraction in three, combined extraction after preliminary iridectomy in eight. Mechanical results were excellent in all but one. Visual results were 20/25 or better in twelve cases, and 20/40, 20/80, 3/50, and 0 in the remainder.

George H. Stine.

Poyales, F. Total extraction of cataract. *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, June, p. 327.

The author is very much in favor of the Barraquer method of intracapsular extraction. He made a trip to Shikarpur, India, in order to perform this operation. With the help of Dr. H. T. Holland he did 1,250 cataract operations, some by the Smith method, and some by the Spanish method. His statistics are as follows:

Number of cataracts operated on	1,250
Smith method	510
Spanish method	740
Loss of vitreous (Smith method)	10.88%
Loss of vitreous (Barraquer method)	6.08%
Expulsive hemorrhages	2%
Iridectomies	41%
Without iridectomies	9%
Peripheral iridectomies	12%
Sphinterectomies	38%
Iris prolapses	11.04%
Decentration of the pupil	7.6%

The author makes a comparison between the original method of Van Hulen and the Spanish method, considering the first a blind procedure, while the second is a scientific way of breaking the zonule by vibratory suction. However, he points out that the Spanish method is not perfect, inasmuch as the surgeon does not know the degree of sclerosis of the zonule, and of course can not previously ascertain and measure the amount of vacuum necessary to remove the lens in toto. When the amount of vacuum is insufficient the lens cannot be removed. When the suction is too strong the capsule may be broken, and then an ordinary operation is necessary to remove the lens cortex and nucleus. When the size of the lens is such that it cannot traverse the pupil, the capsule may break at the sphincter. But when the lens is already in the anterior chamber it may also burst at the edges of the wound. For this reason the incision must be larger than half of the corneal circumference.

Poyales points out that the intracapsular method does not need complete maturation of the cataract, which makes it the ideal operation in old people, with incomplete opacity. There are three kinds of cataract in which the intracapsular method must not be used, namely congenital, traumatic, and secondary. In Poyales' opinion, Kalt's capsule forceps has the disadvantage of tearing the capsule when it is too sclerotic. He found Smith's method very useful in India, where sclerosis of the zonule is almost complete, but Barraquer's method is to be preferred in Europeans. Straub's uveitis, which comes after ordinary operations, and probably is due to phacoanaphylactic endophthalmitis, never occurs after intracapsular extraction by the Spanish method.

M. Uribe Troncoso.

10. RETINA AND VITREOUS

Caramazza, F. **On the origin, structure, and significance of so-called rosettes of the retina.** *Saggi di Oftal-*

mologia (collected papers of the Di Marzio clinic, Rome), 1928, p. 101.

The rosettes of retinal glioma are entirely different from the formations described as rosettes which are found in microphthalmus and in various inflammatory processes of the eye. In the latter these are sections of folds of neural epithelium, related to rupture of the external limiting membrane. In glioma we are not dealing with retinal folds but with formations made up of blastomatous elements in active proliferation grouped around a central cavity. Here we find no trace of a limiting membrane or of rests of rods and cones. In the absence of analogy between the rosettes of glioma and those described in microphthalmus and in eyes with inflammatory processes, the importance which Wintersteiner attributed to them as showing the neuroepithelial nature of retinal glioma loses its force.

Solon L. Rhodes.

Keeler, C. E. **Blind mice.** *Jour. Exper. Zoölogy*, 1928, v. 51, pp. 495-508.

Further experiments with mice in which the retinas lack cones, rods, and visual purple have convinced the author that he was correct in his former statement that such animals have no vision. The most interesting test was that in which dancing mice (always deaf) were exposed to a flash light while pictures were being taken. The animals which lacked rods gave no evidence of being startled, while the controls appeared merely as blurs on the film.

Lawrence T. Post.

Law, F. W. **Unusual case of macular degeneration.** *Brit. Jour. Ophth.*, 1928, v. 12, Dec., p. 646.

A woman aged forty-six years had had gradual deterioration of vision during the preceding two years. The appearance of the external parts was normal. In the region of the right macula there was a vaguely defined circle about fifteen times the diameter of the disc, and of a pale grayish

tinge. The upper part was depressed, showing a dip in the fine vessels crossing the margin. The lower part was well defined and of a distinctly lighter color, resembling a yellowish hyaloid exudate. That this appearance was due to the presence of fluid was demonstrated by its altered position on having the patient lie down. In the left macula was a small irregular dark-grey area resembling the usual pigmentary macular degeneration. Wassermann was positive. Vision, R. 6/60, L. 6/24; six weeks later R. 3/36, L. 6/24. Fields full; right blind spot normal, left could not be elicited; no scotoma. The condition would appear to be one of persistent decolorized subhyaloid hemorrhage in the region of the right macula, with pigmentary degeneration of the left macula.

D. F. Harbridge.

Menacho, M. **Opothrapy with spleen in hemeralopia.** Arch. de Oft. Hisp.-Amer., 1928, v. 28, March, p. 145.

In several cases the author used with success the spleen instead of the liver in essential hemeralopia.

M. Uribe Troncoso.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Bollack J., and Hartmann, F. **Ocular examinations and the syndrome of intracranial pressure.** Rev. Oto-Neuro-Oft., 1928, v. 3, Oct., p. 449.

The authors prefer the term "papillary ectasia" to the orthodox "choked disc". Ectasia of the papilla without visual disturbance is diagnostic of intracranial pressure, and excludes inflammatory affections of the nerve itself, which induce rapid and marked interference with its conduction. One should always bear in mind the "pseudo-neuritis" of hyperopia, and various alterations of the papilla seen in higher degrees of myopia. These are also to be recognized by their refraction, and the absence of associated symptoms. The symptomatology and diagnosis of intracranial condi-

tions related to papillary ectasia are discussed in detail. *A. G. Wilde.*

Charlin, C. **Optic neuritis due to salvarsan.** Arch. de Oft. Hisp.-Amer., 1928, v. 28, May, p. 284.

Absolute blindness came ten days after two salvarsan injections of 0.15 and 0.30 gm. The pupils were dilated and did not react to light, the papillæ were pale and there was pain on pressure on the eyeballs. The diagnosis of retrobulbar neuritis was easy, but the important point was to ascertain if the changes were due to syphilis or to the toxic effect of the drug. The case was one of early syphilis. The diagnosis was made with the ultra-microscope, and the same day an injection of 0.15 gm. neosalvarsan was done, and seven days later another of 0.30 gm. Immediately a severe frontal headache came on. The next day ocular pains started, and six days afterward blindness was complete. The headache and the pain in the eyes disappeared a few days later. Had the former been related to a syphilitic meningitis and the latter to the neuritis, they would have persisted or even increased when the injections were stopped. The author considered them due to the toxic action of salvarsan, and advised discontinuing the injections. Vision came back gradually, and two months later was one-third in the right eye and one-sixth in the left. Mercurial treatment was substituted.

M. Uribe Troncoso.

Ferrer, H. **Lesions of the optic nerve with tumors of the hypophysis.** Arch. de Oft. Hisp.-Amer., 1928, v. 28, Feb., p. 80.

This is a history of seven cases of tumor compressing the chiasm. In all of them the diagnosis was verified by x-ray examinations. The author disagrees with Hirsch, who does not consider papillitis and choked disc as pertaining to the picture of this disease. He found a case with true papillitis and another of postneuritic atrophy. The majority of his cases, however, had simple optic atrophy.

He emphasizes the importance of x-ray examination in all cases of atrophy of the optic nerve.

M. Uribe Troncoso.

Glasscheib, A. **Pathogenesis of retrobulbar neuritis.** *Zeit. f. Augenh.*, 1928, v. 66, Oct., p. 249.

The author points out that a condition of the sphenoid and ethmoid which is frequently missed because of the absence of pus is the development of a noninflammatory transudate associated with edema of the adjacent structures, resulting from a paucity of D vitamin in the diet. This form of sinus disease may be the basis of a retrobulbar neuritis, and an acid diet rich in calcium cures the sinusitis as well as the optic neuritis.

A second condition which may cause retrobulbar neuritis is exudative fibrinous ethmoiditis and sphenoiditis. As the name implies, it is an infectious inflammatory process which may be complicated by collateral edema of the optic nerve and its surrounding tissues. Clinical manifestations are meager, and x-ray examination is usually negative. The author emphasizes this to point out that despite negative findings actual sinus disease may exist which is responsible for the retrobulbar neuritis. *F. H. Haessler.*

Hämäläinen, R., and Teräskeli, H. **Methyl-alcohol poisoning and its treatment.** *Acta Ophth.*, 1928, v. 6, no. 3, pp. 260-265.

The authors discuss the toxicity of the various alcohols. Normal, primary alcohol is the least water-soluble and therefore the least toxic and produces less narcotic effect. Unsaturated alcohols act more intensively than saturated and the effect is less upon the sensorium than upon the deeper centers of the nervous system. Methyl-alcohol poisoning leads to the production of an acidosis in which formic acid is deposited. Later experiments have shown the pure methyl alcohol is not so poisonous, but that other unknown substances present produce the bad effects. Eight

cases of methyl-alcohol poisoning were studied, in one of which the vision was affected, being reduced to counting fingers at 0.5 m. in each eye. Following lumbar puncture on the eleventh day, vision rose to 5/15. The spinal fluid was under a pressure of 100 mm. water and fell to 30 mm. One week later a second puncture reduced the pressure from 80 to 60 mm. and vision rose to normal and remained so. Papilledema disappeared, the vessels became normal, and the scotomata cleared away. This procedure is highly recommended.

E. M. Blake.

Moretti, Egisto. **Bone formation in a glaucomatous excavation.** *Zeit. f. Augenh.*, 1928, v. 66, Oct., p. 239.

Occasionally it is observed that despite bulging of the lamina cribrosa backward no excavation is ophthalmoscopically visible in the optic disc. The cause is usually a filling up of the cup by edema resulting from increased intracranial pressure or a proliferated glial or connective tissue. Inflammation or repeated hemorrhage may stimulate the proliferation.

The author describes histological sections from an eye which early in life was afflicted with adherent leucoma and secondary glaucoma after smallpox, and had been enucleated at the age of fifty-two years because of pain. A typical glaucomatous cup was filled with scar tissue which had probably resulted from papillitis. Osseous islands were found in the proliferated connective tissue.

F. H. Haessler.

Tessier, G. **Physiologic excavation of the papilla in relation to static refraction.** *Ann. di Ottal.*, 1928, v. 56, June, pp. 525-534. (See Section 3, Physiologic optics, refraction, and color vision.)

12. VISUAL TRACTS AND CENTERS

Cushing, Harvey, and Eisenhardt, Louise. **Meningiomas arising from the tuberculum sellæ.** *Trans. Sec. on Ophth.*, Amer. Med. Assoc., 1928, pp.

322-408. (Also Arch. of Ophth., 1928, Jan. and Feb.)

If "What's wrong with you?" is asked in a neurological clinic, the answer "My sight is failing" is more often given than any other. As to meningiomas, primary optic atrophy and bitemporal field defects with a normal sella turcica, in a middle-aged person, constitute the syndrome. These replace the headache, vomiting, and choked disc that formerly suggested intracranial tumor. These tumors practically all take their origin from the meninges, hence the former name "dural epithelioma" has been replaced by "meningioma". The important thing is to recognize the peculiar manifestations of this particular kind of tumor as early as possible, in order that operation may be undertaken under the most favorable auspices.

This paper gives the important features of fifteen cases. Case 1 presented vision failing for nine months, advancing bitemporal hemianopsia, primary optic atrophy, and normal sella. Extirpation caused further damage to one optic nerve, but preserved nasal vision through the other. The condition was stationary after twelve years.

Case 2: Vision failing for eighteen months, primary optic atrophy, bitemporal hemianopsia, beginning absorption of sella. Attempted operation was followed by fatal cerebral edema. The tumor involved the carotid arteries.

Case 3: Optic atrophy, bitemporal hemianopsia, blindness, complete in one eye, and distension of sella led to operation, with partial removal of a typical meningioma. The blindness became complete in the second eye, and the patient died from a fractured hip two years later.

Case 4: A man who had headache, vomiting, vertigo, and loss of vision for eighteen months showed optic atrophy, blindness of left eye, and right temporal hemianopsia. No operation could be done, but autopsy showed a suprasellar meningioma.

Case 5: Progressive loss of vision for fifteen months, primary optic atrophy, and bitemporal hemianopsia, with normal sella. Extirpation of the tumor caused injury to the ophthalmic artery and fatal hemorrhage.

Of the ten other cases, five, after removal of the tumor, were living without recurrence three to five years later. The other five recovered from operation and were living without recurrence, one of them after two years. In most of the cases there was some recovery of vision. One patient wrote ten months after operation: "I am reading sometimes late into the night, which I have not been able to do for two years." In two cases there was temporary polyuria. In another case of bleeding from an injured artery, there were no serious consequences. The average age of these patients was 42.5 years.

These growths start on the anterior margin of the sella, pushing the optic chiasm upward, and doing more harm to one or both of the optic nerves. The differential diagnosis must distinguish them from pituitary adenomas, craniopharyngeal pouch tumors, gliomas of the chiasm, gummatous meningitis, chronic cisternal arachnoiditis, and aneurism. The prognosis without treatment is blindness and death, after an interval possibly as long as ten years. Operation, the only treatment, generally gives continued life and some improvement of vision. Cushing prefers operation by a unilateral osteoplastic, subfrontal, and largely extradural exposure. Complete extirpation is to be aimed at; but even with partial removal the vision improved, and one patient lived on in complete health.

Edward Jackson.

Ineze, A. **The proper determination of the blind spot.** Arch. f. Augenh., 1928, v. 99, Nov., p. 676.

Ineze found that the most consistent results in determining the blind spot or scotomata were obtained when the test object was brought from the blind area toward the seeing

portion. The use of smaller test objects also gives better results and, though more laborious, should be employed in practice.

Frederick C. Cordes.

Swift, G. W., and Dickerson, D. G. **Tumor of the optic thalamus.** *Western Med. Review*, 1928, v. 33, Jan., p. 497.

In the seven cases reported, hemianopsia was not found, although its detection may have been prevented by the poor mental condition. The presence of hemianopsia is of no localizing value in the absence of other signs. Choked disc is usually not seen except as a terminal feature when there is general cerebral edema.

George H. Stine.

13. EYEBALL AND ORBIT

Espildora Luque, C. **Contribution to the pathogenesis of thrombophlebitis of the cavernous sinus.** *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, April, p. 193.

A furuncle of the left side of the nose was incised, and the same night the patient had severe headache with fever and general malaise. Next day the vision of the left eye was very much reduced, and a slight exophthalmos followed. The symptoms increased very rapidly and on the third day there was a hard, blackish cord running from the nose to the inner canthus. The exophthalmos increased, the conjunctiva became edematous, the movements of the globe were abolished, and papillitis with great hyperemia and total loss of vision resulted. The symptoms extended to the right eye. Lumbar puncture gave a turbid liquid, containing pus cells and *Staphylococcus aureus*, which was also found in the blood. The patient died three days later.

M. Uribe Troncoso.

Lewin, T., and White, C. **Gumma of orbit.** *New York State Jour. of Med.*, 1928, v. 28, Dec. 1, p. 1417.

Lewin and White diagnosed and followed such a case from its be-

ginning to complete involution. Approximately ten months after a refraction examination in a man of forty-two years, at which time a complete ophthalmological examination was negative, except for a compound hyperopic astigmatism, the left eye began to protrude rapidly and the vision of this eye became greatly impaired in one week's time. X-ray revealed a hazy mass deep in the medial upper portion of the left orbit. The blood Wassermann was strongly positive.

Bismuth was given once weekly for six doses, combined with potassium iodide internally. The size of the tumor markedly subsided. Arsphenamin was then given, with very little diminution in the size of the tumor. Bismuth was again instituted, with definite subsidence of the gummatous mass. The final result was full standard vision with correction, but not a complete subsidence of the protrusion.

D. H. O'Rourke.

Rochon-Duvigneaud, A. **The mole's eye and problems which it raises.** *Ann. d'Ocul.*, 1928, v. 165, Nov., pp. 801-848.

The anatomy of the mole's eye is most fully discussed, with excellent illustrations. Part of the structure is comparable to the embryological state of human eyes; for example in the vitreous, which contains vessels, and in the lens, which is composed largely of cells with nuclei. Other parts, as the retina, show fairly complete development and differentiation into structures very similar to those in the mature human eye. For this reason the lack of sight can not be entirely explained as a lack of development. The various hypotheses of adaptation of the organism to environment, mutations, etc., are discussed in relation to the apparent regressive changes in the mole's eye. *Lawrence T. Post.*

14. EYELIDS AND LACRIMAL APPARATUS

Blanco, Tomas. **Plastic operations of the lids.** *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, June, p. 313.

After reviewing the history of facial plastics, Blanco claims priority for Spanish surgeons, who are said to have done the first autoplasmic operation on the lower lid with a square flap in 1832. The same operation was described two years later by the French surgeon Dieffenbach, whose name has been given unjustly to the method. The author describes his own operation, in which, instead of making the flap in a vertical direction at the outer end of the eyebrow, he makes a horizontal flap which ends in an angular notch. He also describes a case of ectropion which was operated on by skin-grafting, the skin being taken from the inner part of the arm. *M. Uribe Troncoso.*

Blegvad, Olaf. **A case of acute dacryoadenitis.** *Acta Ophth.*, 1928, v. 6, no. 3, pp. 267-269.

Blegvad's patient was a man of thirty-seven years who presented a unilateral, non-suppurating inflammation of the lacrimal gland. The only etiological factor uncovered was a sore throat which had preceded the eye condition by a few days. Recovery was spontaneous and rapid. *E. M. Blake.*

Dupuy-Dutemps, E. **Lupus of the lids.** *Ann. d'Ocul.*, 1928, v. 165, Nov., pp. 840-853.

Excision of lupus is a satisfactory proceeding and should not be entirely discarded. Grafts from parts of the body other than the face should be used. Face grafts are usually invaded by lupus. One case is cited with two illustrations. *Lawrence T. Post.*

Gomez Marquez, J. **Late results of dacryocystorhinostomy and basic facts about this operation.** *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, April, p. 197.

In this interesting article the author reports the examination of seven cases of dacryocystorhinostomy, which he examined from five months to two and a half years after the operation. In all of them the fistula between the lacrimal sac and the nose

was preserved, and the results on the whole were excellent. The author emphasizes that cases in which the fistula has closed, even though the functional symptoms diminish or disappear, should not be considered as cured, because the infection persists and the passage of the tears is blocked. This will explain the great variety of results claimed by the various surgeons who have done the operation. He discusses at length the causes of failure, and states that they are mostly due to omission of one of the most important surgical steps, namely, suturing together both mucous membranes, the nasal and the lacrimal, at the edge of the hole. It is true of course that these membranes may unite without suture, but that is the exception and usually they remain apart and the wound closes completely. All statistics in regard to results of ordinary operations should state whether the hole into the nose remains open or not. The method of Dupuy-Dutemps is the best, in the author's opinion. *M. Uribe Troncoso.*

Hanger, F. M. **Dacryocystitis and its treatment, past and present.** *Virginia Med. Monthly*, 1928, v. 55, Dec., p. 607.

Hanger strongly condemns extirpation of the lacrimal sac; dacryocystorhinostomy is the treatment of choice in all cases of long standing, where an organized stricture of the duct is present with or without bony atresia. When the mucosa of the duct is merely thickened and chronically inflamed, and the case is seen early, probing and irrigation will usually cure the condition. *George H. Stine.*

Larsson, Sven. **Dacryocystorhinostomy.** *Acta Ophth.*, 1928, v. 6, no. 3, pp. 193-215.

Larsson performed the Toti dacryocystorhinostomy operation (as modified by Kuhnt) in sixty cases, all but one of which had been observed for a year or more. Of these fifty-nine

cases, forty-seven were satisfactory, that is the eye was dry, fluorescein passed through readily, and probing was possible, without a secondary operation. The secondary operations followed the technique of Bohm and were performed ten times, with success in three cases. The author prefers the chisel to the motor-driven burr, as it is safer and quicker. Only the anterior flap of mucous membrane was sutured, and the entire nasal wall beneath the sac was removed. X-ray pictures were found to be of value in performing the operation and in follow-up work. A number of beautiful x-ray plates are shown, and a complete tabulation of the cases is appended to the article.

E. M. Blake.

Neumann, E. **A noncongenital form of hereditary ptosis.** *Arch. f. Augenh.*, 1928, v. 99, Nov., p. 661.

Neumann reports a family many of whose members in the later years of life developed a noncongenital type of hereditary ptosis. Injection of cocaine into the lids produced a widening of the palpebral aperture. The various possible theories as to the basis of this phenomenon are discussed.

Frederick C. Cordes.

Smith, J. F., and Bump, W. S. **Lymphoid hyperplasia of lacrimal and salivary glands.** *Ann. of Surg.*, 1928, v. 88, July, p. 91.

A case of Mikulicz's disease involving the salivary glands alone is reported and the literature completely reviewed. The authors conclude that the disease is essentially an involvement of the lymphoid tissue of the lacrimal and salivary glands with secondary destruction of the parenchyma, and that the tissue is subject to diseases identical with those of lymphoid tissue elsewhere in the body. Hence a separate classification of these diseases is deemed unnecessary.

P. Thygeson.

Stegman, Louis V. **Extirpation of the tear sac.** *Amer. Jour. Surg.*, 1928, v. 4, June, p. 602.

Stegman reports four unusual cases in which sac extirpation was done
P. Thygeson.

Terrien, F. **Recklinghausen's disease and plexiform neuromata of the eyelid.** *Med. Press*, 1928, v. 126, July 4, p. 10.

Terrien reports two cases of Recklinghausen's disease involving the eyelids and discusses the differential diagnosis. The first case had complete ptosis with thickening of the upper lid. Operative removal of the fibroid mass gave an excellent result.

P. Thygeson.

15. TUMORS

Barletta, V. **Carverous angioma of the orbit.** *Ann. di Ottal.*, 1928, v. 56, June, pp. 510-518.

(The above reference is repeated because in the January, 1929, issue (p. 73) it was incorrectly attributed to the *Archivio di Ottalmologia*.)

Brunschwig, A. **Dermoid of the cornea in a guinea pig.** *Amer. Jour. Path.*, 1928, v. 4, July, p. 371.

Brunschwig reports a case of true dermoid of the cornea in a guinea pig and states his belief that many dermoids reported as corneal in origin can not be finally classified as such because of lack of microscopic evidence and because many of them were at the limbus with more of the tumor extending over sclera than cornea.

P. Thygeson.

Caramazza, F. **Lympho-angio-endothelioma of the orbit.** *Saggi di Oftalmologia* (collected papers of the Di Marzio clinic, Rome), 1928, p. 85.

Lympho-angio-endotheliomata of the orbit have as their site of election, perhaps even exclusively, the region of the lacrimal gland, because it seems that only in the gland and in its vicinity exist lymphatic vessels covered by a continuous endothelium. Rather than in the gland itself they originate in one of its coverings, the capsule or the periosteum.

Endotheliomata of the orbit may have a malignant course. The age of the patient seems to play an important part in the course; the younger the subject, the more rapid the development.

The malignancy of these tumors consists principally of a rapid infiltration and destruction of tissue, especially in the recurrences. Rarely is there metastasis.

The different histological aspect of the primary growth and of the secondary nodules (the first, a classical endothelioma; the second, appearance of an alveolar sarcoma) suggests that this diversity is dependent on more or less rapid development.

It is important to follow the operative procedure in these cases by roentgen therapy. The greater the active proliferation of the blastomatous elements, the more efficacious the x-ray.

Solon L. Rhode.

Eber, Carl T. **Leucosarcoma of the orbit.** Jour. Missouri State Med. Assoc., 1928, v. 25, July, pp. 299-301.

Eber discusses sarcoma of the orbit and cites a case, with complete pathological report, in which all the intra-orbital structures, including the eyeball and the orbital wall of the posterior ethmoidal sinuses, were invaded.

P. Thygeson.

Gourfein, D. **Epibulbar papilloma in course of transformation into a malignant tumor, on an eye injured over forty years before.** Rev. Gén. d'Opht., 1927, v. 42, Jan., p. 5.

During childhood a man had the right eye injured by a perforating wound near the border of the cornea. About forty years later he first noticed a small papillomatous growth of the conjunctiva near the scar of the old injury. The tumor was removed and there has been no recurrence in three years. The base of the growth was cauterized with the galvanocautery and covered with a large conjunctival flap. The pathologist's diagnosis was: "papilloma of the conjunctiva in course of carcinomatous transforma-

tion." A brother had died of some gastric neoplasm. This suggests the possibility of hereditary predisposition. Trauma prepared the soil for the development of the neoplasm in a predisposed person. A slow cellular proliferation may have proceeded for years before the growth attracted the notice of the patient. *J. B. Thomas.*

Greear, J. N. **Sarcoma of the choroid.** Virginia Med. Monthly, 1928, v. 55, Dec., p. 633.

Six cases are presented in full detail, including the pathologist's reports. One case is of more than usual interest in that the eye, enucleated because it was soft, atrophic, and painful, was found to contain a melanotic sarcoma completely filling the vitreous chamber. Another case, seen early, resembled subsiding exudative choroiditis. (References and four photographs.) *George H. Stine.*

Hippel, E. **Spontaneous healing of glioma of the retina.** Klin. M. f. Augenh., 1928, v. 81, July, pp. 30-32. (1 ill.)

The right eye of a boy aged five years was enucleated on account of glioma endophytum. At the age of thirty-four years the patient returned for refraction. A very fine veil of diffuse opacities of the vitreous covered the left fundus. On a vertical oval area of disturbed pigment epithelium a white irregular nodular formation projected six diopters into the vitreous: this was unchanged after two years. Hippel considers this as a calcified glioma, spontaneously healed, with almost normal function ($V.=0.8$). The lacking of anatomical examination of the right eye was, of course, regrettable. So far only three such cases have been reported.

C. Zimmermann.

Josef, S. **Prognosis for life with retinal glioma.** Ophthalmologicky Sbornik, 1928, v. 2, p. 495.

The author reviews twenty-six cases of retinal glioma, three with involvement of both eyes, treated at the

Czech Ophthalmological Clinic in Prague from 1905 to 1906. In five cases the glioma was limited to the retina at the time of enucleation, as demonstrated histologically. One case was lost track of and four are alive. In seven enucleated eyes the glioma invaded the uveal tract; four patients survived without recurrence; recurrence and death occurred in three cases. Of eight cases that appeared after extrabulbar involvement, there was a recurrence in seven cases and one was not followed. In eight cases the eyes were not examined histologically; seven were cured; in one there was recurrence. The recurrences happened after a few weeks, the latest within four months. Exenteration of the orbit was of no value, the patients dying of intracranial involvement.

Ray K. Daily.

— Leser, O. **A case of latent flat leucosarcoma of the choroid.** *Ophthalmologicky Sbornik*, 1928, v. 2, p. 555.

The author reports a case of flat leucosarcoma of the choroid in a man fifty-one years of age, who came complaining of pain in the left eye and colored halos around the lights. His left eye showed symptoms of inflammatory glaucoma, circumcorneal injections, cloudy cornea, diminished sensitiveness of the cornea, shallowness of the anterior chamber, dilated pupil, rise of tension, and vision 6/60, and form field contracted nasally to forty degrees. An iridectomy was performed without much improvement. Vision fell further, and a cyclodialysis was performed five weeks later. Three weeks later the cornea cleared up and tension was twenty-nine mm.; vision was fingers at four meters, nasal field contracted to twenty-five degrees; slight hyperemia of optic papilla. He went home and returned two years later with a subconjunctival raised circumcorneal tumor. The cornea was transparent, the anterior chamber deep, and the papilla had a glaucomatous excavation; tension was thirty mm. and the eye was blind. The eye was enucleated, and histologically

there was found a flat leucosarcoma which involved the entire choroid and extended into the ciliary body. The tumor cells extended through the sclera by the cyclodialysis route, forming the subconjunctival tumor around the cornea. Through the posterior veins the cells invaded the peribulbar tissue around the optic nerve.

Ray K. Daily.

— Santonastoso, A. **Rare epibulbar tumors.** *Ann. di Ottal.*, 1928, v. 56, June, pp. 535-548.

(The above reference is repeated because in the Jan., 1929, issue (p. 74) it was incorrectly attributed to the *Archivio di Ottalmologia*.)

Schmidt, Max. **Chloroma of the orbits.** *Oftal. Selskab i København's Forhandling*, 1928, pp. 33-37.

The author reports a case of double exophthalmos in a child of ten months. The symptom had appeared five weeks before, first on the right side, and in a week also on the left. Later there appeared swelling in the temples, consisting evidently of periosteal or subperiosteal thickenings. This new growth manifested no tenderness, was hard and smooth, and the skin moved over it freely. There was general enlargement of lymph nodes in the neck, the axillae, and the inguinal regions. The blood picture presented a moderate reduction of hemoglobin with a corresponding reduction in the number of red cells, otherwise nothing definitely abnormal. Two exposures to roentgen rays were given. Within three days of the last treatment the thickenings and the exophthalmos had largely disappeared, and the child went on to rapid recovery. At the time of this report, sufficient time had not elapsed to state the final outcome. The writer considered it a case of true chloroma.

D. L. Tilderquist.

Zamenhof, A., and Plonskier, M. **Metastatic adenocarcinoma of the choroid.** *Ann. d'Ocul.*, 1928, Oct., v. 165, pp. 748-752.

This is the report of a case of choroidal cancer secondary to carcinoma of the stomach. Histological description is given and a section illustrated. The statistics of Ascher are quoted.

L. T. Post.

16. INJURIES

Chou, C. H. **Angiopathia retinae traumatica (Purtscher); with some remarks on pigment migration.** *Brit. Jour. Ophth.*, Nov., 1928, v. 12, p. 570.

A boy aged sixteen years was struck on the eye by a ball. There was loss of vision lasting about an hour. He came under observation one week later. Examination revealed in the temporal and superior sector of the fundus a large narrow patch of milky white opacities extending from the disc margin and broadening out into the periphery. It was situated behind the retinal vessels and was sharply defined. In this area were aggregations of pigment in a network formation. On the ninth day was observed a small hemorrhage, with relative scotoma and a large absolute scotoma in the lower temporal field. Vision 4/30, improved within five weeks to 6/20, with correction, 6/12. The fundus picture had changed considerably. Inside the nerve head along the horizontal artery, and especially along the main superficial vessel trunk, were numerous black pigment dots, forming black accompanying stripes. They seemed to be separated here and there from the vessel walls by a small space, probably the perivascular lymph space. The vessels were normal. The fine coal-black pigment particles on the grayish background were arranged in radial streaks following the retinal nerve fiber layer.

Purtscher's theory is discussed. This patient sustained an orbital contusion compressing the orbital contents and resulting in a sudden increase of intracranial pressure after which the orbital contents at once returned to their original position. The interesting pigment migration was not hematogenous, or of choroidal or inflammatory origin. Such uniform pigment disturb-

ance can find its explanation only in migration from the pigment epithelial layer of the retina. (Three illustrations.)

D. F. Harbridge.

Iritzer-Braun, Olga. **Injury of the orbit with methylen violet pencil (anilin).** *Klin. M. f. Augenh.*, 1928, v. 81, July, pp. 95-101. (1 ill.)

A boy aged three years, in failing health, pushed the point of an indelible pencil into the right upper lid. Although the piece of the pencil was removed and the wound scraped, the swelling of the lid increased, and exophthalmus developed, necessitating repeated incisions and removal of black-violet necrotic tissue, which contained staphylococci and short chains. Recovery required three months. For irrigation, salt, bichloride of mercury, boric acid, or distilled water is contraindicated, and from five to ten per cent solutions of tannic acid are recommended, or, according to the recent experiments of Comberg on rabbits, acetic acid and alcohol. The poisonous substance is methylen violet.

C. Zimmermann.

Klein, Eva. **Ocular lesions in the manufacture of artificial silk.** *Arch. d'Ophth.*, 1928, v. 45, Nov., p. 686.

Workers in this industry would have a sudden attack of pain in the eyes with extreme photophobia and blepharospasm. On examination the conjunctiva was found injected and the cornea peppered with small superficial epithelial disturbances which later broke down into ulceration. Under atropin and occlusive dressings, the eyes returned to normal in a few days. The same individuals were liable to repeated attacks. Upon investigation it was found that small droplets of sulphuric acid and sodium sulphate thrown off by the spinning machines would cause this disturbance. Some new workers also conveyed the solution to the eyes with the hands. With an atomizer similar lesions were produced in rabbits with either the sulphuric acid or the sodium sulphate. For prophylaxis, instruction of em-

ployees and glass screens before the spinning machines are suggested.

M. F. Weymann.

Law, F. W. **Aseptic serous meningitis following intraocular foreign body.** Brit. Jour. Ophth., 1928, v. 12, Dec., p. 644.

This rare condition was observed in a male aged seventeen years. Twenty-four hours following the successful removal of an intraocular piece of steel, except for a few vitreous floaters and folds in Descemet's membrane the condition was satisfactory. Two days later the lids were swollen, the conjunctiva chemotic, and the cornea hazy, the patient was drowsy, the head retracted, and there was headache. The eviscerated eye showed pus in the vitreous. Twenty-five c.c. of clear cerebrospinal fluid was withdrawn to relieve excessive pressure. Examination of the fluid showed no excess of cellular elements, no micro-organism. Conditions gradually improved, and the patient was discharged in two weeks.

D. F. Harbridge.

McReynolds, J. O. **Foreign bodies within the eyeball.** Texas State Jour. Med., 1928, v. 23, Feb., p. 656.

The subject is discussed under three primary headings: the location and character of the foreign body, the measures of relief, and the probable immediate and remote results. Fifteen illustrative cases are reported. Four cases demonstrate that the foreign body may be so small or of such a nature as to be missed by careful x-ray. With regard to magnet extraction, the posterior route and the Sweet magnet are preferred. Retinal detachment at the site of the scleral incision has not commonly followed this procedure, and when it has occurred it was due to the inflammatory process induced by the presence of the foreign body and the original traumatism. Free removal of infected vitreous around the foreign body is of value in limiting the spread of the infection and saving the globe for use-

ful vision. In two cases in which the foreign body had been present for three years and the lenses cataractous, magnetized probes were introduced through the pupil immediately after cataract extraction, passed through the vitreous to approximate the foreign body embedded in the retina, and the foreign body extracted with restoration of useful vision. Two cases illustrate the value of conservative treatment instead of immediate enucleation, even in the presence of a foreign body that cannot be removed. It is perfectly safe not to disturb a foreign body that is giving rise to no inflammatory reaction.

George H. Stine.

Sabata, J. **Chalcosis.** Ophthalmologicky Sbornik, 1928, v. 2, p. 384.

A patient had the left eye injured by a shower of copper splinters, ten of which were removed from the cornea. The eye healed uneventfully. When seen five years later he had chalcosis of the eye, although he experienced no difficulty of any sort and had normal vision. Under the anterior lens capsule was a rosette-shaped deposit of crystals; under the posterior capsule, a diffuse opacity; in the vitreous, a number of fine interlacing fibers with glistening points, in the macular region, glistening white spots. The route of entry of the foreign body could not be demonstrated, although with the slit-lamp a grey area was seen below the center of the cornea four mm. from the limbus, which might have represented the site of the perforating wound.

Ray K. Daily.

Zabor, A. **Intraocular foreign bodies.** Ophthalmologicky Sbornik, 1928, v. 2, p. 375.

After healing of a traumatic corneal perforation, with magnet extraction of a foreign body, two eyelashes were seen in the anterior chamber without having caused any irritation in the eye. In case of regressing chalcosis of the globe of a year's standing, the retinal disturbance had entirely disappeared and only a few traces of a

pseudocataract remained. The vision was stationary in spite of the fact that a skiagram taken by the method of Vogt showed an intraocular foreign body. (Article contains print of skiagram.)
Ray K. Daily.

17. SYSTEMIC DISEASES, INCLUDING PARASITES

Albrich, K. Influence of infectious diseases on eye affections. *Klin. M. f. Augenh.*, 1928, v. 81, July, pp. 61-67.

In a case of unilateral parenchymatous keratitis in a woman aged thirty-one years, with marked edema of the cornea, a severe bilateral episcleritis set in twenty days after bismuth treatment and resisted all therapeutic efforts for two months, but after an intercurrent malaria completely disappeared within forty-eight hours. From this observation and from a review of the literature the author distinguishes three groups of influences of general infections on eye affections: (1) All diseases which diminish or remove the allergy of the skin toward tuberculin may in a short time make scrofulous eye processes disappear. (2) Infection in the immediate neighborhood of the eye, e.g. erysipelas of the face. Here, as in the (3) group of general infections (measles, cholera, malaria, etc.) one must suppose that the bacterial infection evokes protective and resisting tendencies, beside parenteral protein action. The author considers malarial inoculation justified in severe eye affections endangering vision and which resist treatment.

C. Zimmermann.

Asbury, M. K. A pathologic study of two cases of ocular tuberculosis. *Arch. of Ophth.*, 1928, v. 57, pp. 603-611.

This paper presents a careful discussion of two cases of ocular tuberculosis, with pathological report. The author apparently feels that these cases do not carry out the theory of Verhoeff that the infection of the sclera is by way of the filtration angle, that the bacilli are scattered through the intact ciliary epithelium

with the aqueous humor, and that they are carried by it to the filtration angle. She was unable to find the minute exudates of epithelial cells in and on the ciliary epithelium. The process in the sclera was far in advance of that in the iris. She is impressed by the fact stated by Chou that deep scleritis of tuberculous nature may be present without characteristic signs of scleritis, and that a cyclitis of tuberculous origin may simulate scleritis.
M. H. Post.

Barsan. Intraocular cysticercus with secondary migration into the anterior chamber. *Arch. d'Ophth.*, 1928, v. 45, Nov., p. 694.

The patient had an attack of iridocyclitis in September, which cleared up in one month, and in December he noticed a sudden loss of vision in the same eye. Upon looking in the mirror he noticed in the center of the pupil a blue spot which later dropped down into the anterior chamber with return of vision. Examination showed a small cysticercus freely motile in the aqueous. After fifteen days the eye became irritated and the parasite was removed with iris forceps. Microscopic examination confirmed the diagnosis. It was concluded that the cysticercus had entered the eye through one of the long posterior ciliary arteries and localized in the ciliary body at the time of the iritis. After a month it had entered the posterior chamber and was carried through the pupil into the anterior chamber by the currents of the aqueous. After operation the eye appeared normal.
M. F. Weymann.

Bartels, Martin. Association of internal diseases of the eye with those of the ear. *Zeit. f. Augenh.*, 1928, v. 66, Nov., p. 293.

That parenchymatous keratitis is associated with deafness is well known, but the author points out that in this disease the deafness always follows inflammatory involvement of the iris and the disturbance is always

labyrinthine. He has also observed a considerable number of cases of labyrinthine deafness associated with iritis of other etiology, and the well-known deafness of sympathetic ophthalmia is but a special case in this same category.

A third group is composed of cases in which deafness is associated with choroiditis and chorioretinitic atrophy, including those of high myopia and central chorioretinitis of unknown origin.

The reason for this association is as yet unknown. The large number of observations speaks against an accidental association. It is probable that the vestibular apparatus is also involved, though our tests are too gross to discover slight affections of this structure.

The author has also observed one patient in whom hardness of hearing was associated with glaucoma secondary to iridocyclitis. Several times the hearing was less with increase of intraocular tension and returned with normalization of the eye. Brunner has observed nystagmus associated with retrobulbar neuritis, and Bartels has seen normal hearing with absence of vestibular excitability of the eyes, and pointing tests associated with total optic atrophy of unknown cause in a young girl. Ear manifestations have been observed with choked discs, and in tuberous sclerosis simultaneous involvement of the porus acusticus of the retina and of the skin is known. Simultaneous disturbances of the pigment of the eye and ear have been repeatedly observed and the significance of this relationship is not as yet clear.

F. H. Haessler.

Berghausen, Oscar. **Tuberculin therapy in ocular tuberculosis.** *Arch. of Ophth.*, 1928, v. 57, Nov., pp. 583-593.

This paper reviews the case histories of seventeen patients with ocular tuberculosis. The author used tuberculin B.E. and T.R., and the tebo-protein of Toenniessen,—found diag-

nostic tuberculin tests satisfactory, especially when producing a mild general or focal reaction, from which latter he had no bad effects. He feels that generalized tuberculosis should be treated at the same time, or preferably before the specific ocular therapy is undertaken. *M. H. Post.*

Caesar, J. **Cutaneous luetic reactions; attempts to induce with alcoholic extracts.** *Ophthalmologicky Sbornik*, 1928, v. 2, p. 172.

The writer reviews the reports on luetic subcutaneous and intradermal tests with luetin and alcoholic extracts of normal tissue; he quotes Klausner's conclusions that a positive luetin reaction is obtained in many cases of tertiary, hereditary, and gummatous syphilis in which the Wassermann tests were negative. In twenty cases of parenchymatous keratitis the luetin test was positive twelve times and the Wassermann five. This test is of service to the ophthalmologist in parenchymatous keratitis and iridocyclitis. The author's own tests with alcoholic extracts of human liver in twenty-five cases of various eye diseases, some of which had positive Wassermann tests, gave negative reactions.

Ray K. Daily.

Fernandez, F. **Radium treatment of subretinal cysticercus in case of early diagnosis.** *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, Jan., p. 1.

The author describes a case in which he was able to observe the patient twenty days after the first symptoms. Exactly in the center of the macula he saw a cysticercus vesicle surrounded by two hemorrhages. Many white brilliant spots were scattered around. The other eye had been lost from infancy. Not being able to operate at the macula, he used thirteen mgs. of radium in a lead box two mm. thick. The box was fastened in a mold of the orbital region, made with dental compound. With the pupil widely dilated three sittings of about thirteen hours length

in all were made, the last ones with the lids closed. The applications killed the parasite, leaving a white atrophic spot and some vision. After one year the author examined the patient again, finding at the macula a cyst which probably contained the dead cysticercus. Central vision was then entirely lost.

M. Uribe Troncoso.

Gill, W. D. **Ocular symptomatology in dengue.** Arch. of Ophth., 1928, v. 57, Nov., pp. 628-638.

This paper is based on an analysis of 1,241 cases. The predominating ocular symptoms, associated with generalized muscular disturbances, are retrobulbar pain, photophobia, inflammation of the conjunctiva, and engorgement of the vessels of the retina and of the optic nerve. For the retrobulbar pain little can be done, except administration of salicylates and the like. Photophobia is relieved by dark glasses. The burning and smarting resulting from the conjunctivitis can be relieved by cold compresses, mild local anesthetics, and so on. Weakness or paralysis of accommodation occurs, but passes off in three to four weeks. The toxic agent is apparently borne by the stegomyia and is carried by the individual in the blood stream. It has, however, never been demonstrated.

M. H. Post.

Jones, C. P. **Contraction of the visual fields due to focal infection.** Virginia Med. Monthly, 1928, v. 55, Dec., p. 627.

Marked concentric contraction of fields was completely relieved by extraction of abscessed teeth in one case. Another case of contraction and almost complete loss of central vision showed definite sinus pathology (right frontal, posterior ethmoids and sphenoid) and responded fully to opening and drainage.

George H. Stine.

MacCallan, A. F. **The relation between dental and ocular disease.** Dental Surgeon, 1928, Oct. 13.

The material on which the present

paper is based is a series of clinical cases seen during the last two years in which ocular changes have been coexistent with dental disease. In some of the cases dental treatment has resulted in a cure of the ocular condition, in others an amelioration was obtained. In still others the eye changes were permanent, but since they demonstrated the presence of dental disease it was to the advantage of the patient to direct his obtaining adequate treatment from the dental surgeon, thereby preventing the onset of graver constitutional disease. Among the cases reported as associated with dental sepsis are included blepharitis, meibomian cysts, conjunctivitis, episcleritis, corneal ulcer, conical cornea, dacryocystitis, iritis and cyclitis, opacities of lens, vitreous opacities, changes in retina and choroid, orbital cellulitis, suppuration of the antrum.

The changes in the lens, first slight opacity, then what is called immature cataract, and finally mature cataract, are probably the result of changes in nutrition of the lens brought about by absorption of toxic material from some septic focus, most commonly from the oral cavity. Conditions of toxic absorption, especially when the teeth are concerned, are practically always accompanied by a pathological exudation from the vessels of the ciliary body into the anterior part of the vitreous. This may organize, forming opaque streamers, or vague masses. These can be seen by using a slit-lamp, often not without its use.

MacCallan concludes that the eye is an extraordinarily sensitive danger signal in the presence of any form of chronic sepsis in the body. It reacts in a similar manner to all forms of sepsis, though apparently more quickly in dental and tonsillar sepsis than in other forms. In a case in which important changes are occurring in a patient's eye and in which there is dental sepsis present, it is clear that the mouth must be rendered as clean as possible, as quickly as possible.

Park Lewis.

Scalzitti, G. **Specific therapy in luteal ocular diseases. The importance of the spinal fluid Wassermann.** *Ann. di Ottal.*, 1928, v. 56, June, pp. 481-503.

(The above reference is repeated because in the January, 1929, issue (p. 80) it was incorrectly attributed to the Archivio di Ottalmologia.)

Winkler-Prins, C. **The treatment of experimental tuberculosis of the eye by sanocrysin.** *Arch. f. Augenh.*, 1928, v. 99, Nov., p. 523.

(See editorial, February issue of this Journal, page 140.)

18. HYGIENE, SOCIOLOGY, EDUCATION AND HISTORY

Blanchard, Phyllis. **Reading disabilities in relation to maladjustment.** *Mental Hygiene*, 1928, v. 12, Oct., pp. 772-788.

Failure in reading constitutes the basic element of failure in from ninety-nine per cent to twenty-five per cent, in decreasing ratio from the first to the eighth grades inclusive. The child with this difficulty is usually classed as mentally retarded without a sufficient analysis of the trouble. When the reading disability lasts for several years school failure follows, and, unless adequate and socially acceptable compensations are developed, personality and behavior deviations are apt to rise. These are usually mild; as day dreaming or oversensitiveness, lack of attention. Even though adequate compensations for the feeling of inferiority are found, the education is apt to suffer. Group teaching for these individuals usually fails. A diagnostic study is required followed by special methods of individual instruction designed to build up the deficient parts of the reading process.

Some common causes of reading disability are poor vision, emotional disturbances in early years of school life, inadequate teaching in the early grades, and instruction by too many different methods of pedagogy. Analysis of reading defects may show

visual or auditory trouble, defective vocal-motor reactions or visual verbal memory or span of visual perception. With correction of the reading difficulty the whole maladjustment disappears.
L. T. Post.

Davis, P. A. **Near vision and illumination in industry.** *Jour. Ohio State Med. Jour.*, 1928, v. 24, Nov., p. 875.

The author set up an arbitrary standard of about fourteen inches as the "working point," and found that vision at this distance was most acute with illumination, free from glare, of ten to twelve foot candles. Correctly applied illumination and corrected near vision increase the individual's efficiency 12.6 per cent to 30 per cent according to the degree of refractive error. Accidents are decreased. (Charts and tables.)

George H. Stine.

Examination of school children in Great Britain. *Lancet*, 1929, Jan. 12, p. 96.

The report of the chief medical officer to the Board of Education (Great Britain) for 1927 indicates that about two million children are inspected every year, requiring the services of two thousand doctors, six hundred dentists, and nearly five thousand nurses. About one-fifth of those examined need some medical treatment. Defects of sight are about one-third of the total number of defects. About ten per cent of all children need visual correction. During the year eight additional ophthalmic specialists and fifteen new ophthalmic clinics were provided. There is almost universal agreement as to the tonic value of light on tired and languid children. The blind children ascertained during the year numbered 1,925, and the partially blind 4,929. There is no sign of diminished incidence of physical defects; although the general physical condition, as shown by physique, health, nutrition and cleanliness, tends steadily to improve. The lack of effective teaching

of hygiene is the weakest link in the whole chain of child welfare. Hygiene must not only be taught, but must also be practised every day.

Edward Jackson.

Friedenwald, H. **Relations between ophthalmology and internal medicine.** *Pennsylvania Med. Jour.*, 1928, v. 32, Dec., p. 162.

The author follows the history of the changing relations of ophthalmology and general medicine to the point at which they have now arrived, a relation of great interdependence. The further progress of medicine will increase and intensify the bonds of relationship between all the specialties and general medicine and thus establish the integrity of the whole of medical science.

George H. Stine.

James, R. R. **William Charles Wells, M.D., F.R.S., 1757-1817.** *Brit. Jour. Opth.*, 1928, v. 12, Nov., p. 561.

This communication contains a short biographical sketch of Wells. Born at Charleston, South Carolina; educated in England and Scotland, and finally locating in London. Here he practiced ten years before his income amounted to 250 pounds per year; 764 pounds was his bumper year. The two most outstanding contributions in his collected works are two essays; one upon simple vision with the two eyes; the other on dew. In the first named essay Wells first discusses Aguilonius's opinion that an object is seen single by both eyes, because it is seen by each of them in the same external place. The second section of the essay discusses his own theory respecting visible direction. The third part of the essay is composed of eighteen pages devoted to several other phenomena of vision.

D. F. Harbridge.

Jeandelize. **The amount of visual acuity necessary for automobilists (concluded).** *Arch. d'Opht.*, 1928, v. 45, Nov., p. 700. (See January issue, p. 81.)

The discussion of the various regulations in different countries is too detailed to abstract. One can only say that there is a great variation in the requirements. The writer concludes first of all that signals with inscriptions should not be used but that form signals should be adopted. The minimum visual acuity should be 3/10 for one eye and 5/100 for the other. Monocular individuals should have an acuity of 7/10 without correction. The visual fields should be normal. Diplopia and hemeralopia should not be present. Red and green should be recognized. Examination should be made every five years or immediately after an accident. Even stricter regulations should be enforced on drivers of taxicabs and other public vehicles.

M. F. Weymann.

Kempf, G. A., Jarman, B. L., and Collins, S. D. **A special study of the vision of school children.** *Public Health reports*, 1928, v. 53, July, pp. 1713-1739.

The authors, in a very complete study of 1,860 Washington, D.C., school children examined under a cycloplegic, report the following main conclusions: (1) that the simple Snellen test reveals but a small percentage of the actual number of refractive errors in children; (2) that the hyperopic eye is seldom found and the myopic eye usually found with the Snellen test; (3) that the frequency of myopia tends to increase between the seventh and twelfth years; (4) that the hyperopic eye tends to improve and the myopic eye tends to grow worse with advancing school age. The study includes ten graphs illustrating the frequency and distribution of the various visual defects, and so on.

P. Thygeson.

Mukerjee, S. K. **Observations from the ophthalmic work at the Carmichael Medical College Hospitals in 1927.** *Calcutta Med. Jour.*, 1928, v. 23, Aug., p. 45.

This paper is a statistical report of

cases treated in the indoor and outdoor departments, with more detailed reference to cataract operations, glaucoma, glioma, keratoconus, sympathetic ophthalmia, Krönlein's operation, and epibulbar sarcoma. Eleven photographs are shown.

George H. Stine.

Pi, H. T. **The history of spectacles in China.** *China Med. Jour.* 1928, v. 42, Oct., p. 742.

Spectacles, or at least the magnifying glass, must have been started between the Chou, Chin, and Han dynasties, 1766 to 140 B.C. The substance used—Hou Chi Chu, "talc in its substance"—was produced in India. The first mention of spectacles, as such, is 209 B.C. The wearing of spectacles by the aged is mentioned in the Sung dynasty, 960 A.D., and it became more popular in the Yuan and Ming dynasties, 1279 to 1368 A.D. The material is described as "dark clouds covering the sun", and was probably Yun Mu stone, imported from Turkestan or Sumatra.

George H. Stine.

Small, W. L. **Industrial visual efficiency loss.** *Jour. Missouri Med. Assoc.*, 1928, v. 25, June, p. 258.

Small describes the proper procedure in the estimation of visual efficiency loss as required by the Missouri Workmen's Compensation Commission. In Missouri, awards for compensation are based on: (1) central visual acuity efficiency, (2) visual field efficiency, (3) motor field (ocular muscle function) efficiency.

P. Thygeson.

Thorne, F. H. **A review of depth perception.** *Military Surgeon*, 1928, Nov., p. 643.

Ability to judge distance accurately is a most important factor in aviation. It is this factor of sense which enables the pilot to level off his ship at the proper distance from the ground, while landing; to take off with a safe margin over trees, buildings, etc.; and to fly in close forma-

tions. Accurate judgment of distances is important to the aviator because, if this sense or function is impaired, it is impossible for him to learn to fly an airplane safely unless he is given an enormous amount of flying training. He may under these conditions become sufficiently proficient to fly with comparative safety, but he will never attain even an average degree of proficiency. An experienced flier who has been deprived of some of the basic factors may be able to fly a ship with reasonable safety because he has learned from his flying experience to utilize to a marked degree the adjunctive factors. However he is not so reliable as the normal person, and crashes have resulted from this defect.

Of persons who are inaccurate in judgment 99.5 per cent have a defective ocular mechanism. The defects may be reduction of vision in one or both eyes, or refractive errors resulting in ocular fatigue and manifested by accommodative asthenopia, heterophoria, or insufficiency of convergence. A persistent parallactic angle of more than 9.119 seconds, i.e., a depth difference of more than twenty-five millimeters, is considered as defective provided an ocular defect is present. Any hyperopic error in refraction may cause inaccurate judgment. Myopic errors have little effect upon judgment unless the error is sufficient to cause diminished acuity of vision and insufficiency of convergence.

If in the first series of trials the candidate makes an average error of over twenty-five millimeters, e.g., between twenty-six and fifty, and no ocular or general physical defect can be found to account for it, it is advisable to recheck him every day for at least three days. Invariably such a candidate will eventually attain an average error of twenty-five millimeters or less. Experience has taught that these individuals experience no difficulty in flying, in so far as judgment of distance is concerned.

H. V. Würdemann.

Utermann, H. **Metropolitan statistics on blindness.** *Zeit. f. Augenh.*, 1928, v. 66, Oct., p. 229.

The author analyzes 345 cases of blindness in Cologne about which data were available. Only individuals older than twenty years, that is those that had been discharged from institutions for the blind, were included and blindness resulting from war injuries was not a part of this study. Twenty-four per cent were the results of congenital lesions and dispositions, of which myopia and retinal detachment constituted more than one-half and glaucoma about one-seventh. Of blindness resulting from acquired disease gonorrhea was responsible for one-sixth and syphilis for slightly less than one-third. Physical injury caused less blindness than either of these two diseases.

F. H. Haessler.

Velez, D. M. **Some data for the history of ophthalmology in Mexico.** *Arch. de Oft. Hisp.-Amer.*, 1928, v. 28, Jan., p. 16.

A complete history of ophthalmology in that country should be divided in three parts: (1) period antedating the conquest by Cortés; (2) during the Spanish régime; (3) from the acquisition of independence in

1810 until today. The author only writes of the last period. From 1825 to 1829, Dr. J. M. Muñoz did cataract operations by the Daviel method, and for this purpose he invented some instruments which are shown in the illustration accompanying the article. Since then many ophthalmologists have practised in the country with great success and Velez writes of them at length. He also describes the history of the teaching of ophthalmology in Mexico and the special hospitals and societies existing in the country. His article must be read in the original, to do it justice.

M. Uribe Troncoso.

Zabor, A. **Criteria to be adopted in estimating results after eye injuries.** *Ophthalmologicky Sbornik*, 1928, v. 2, p. 363.

The author points out that in the pursuit of one's occupation central vision is of more importance than peripheral and stereoscopic. He urges that at the first examination after an ocular injury both eyes be carefully noted for the site of injury, the convergence power, the condition of the optic media, the refraction, the fundus, and old injuries and scars; and that vision be taken with and without glasses.

Ray K. Daily.

NEWS ITEMS

News items in this issue were received from Drs. F. E. Burch, Saint Paul; C. A. Clapp, Baltimore; Gaylord C. Hall, Louisville; Edward D. LeCompte, Salt Lake City; J. L. McCool, Portland, Oregon; James M. Patton, Omaha; G. Oram Ring, Philadelphia; Edward R. Ryan, Milwaukee; and Charles P. Small, Chicago. News items should reach **Dr. Melville Black**, Metropolitan building, Denver, by the twelfth of the month.

Deaths

Dr. Edwin L. Russell, Kansas City, aged fifty-four years, died December eighteenth.

Dr. C. Gurnee Fellows, who for many years had been one of the leading ophthalmologists of Chicago, died February second.

Dr. Eldrea B. Cayce, Nashville, Tennessee, aged fifty-two years, died December fourth at the Michael Reese hospital, of a self-inflicted bullet wound.

Dr. Joseph Leo Behan, Brooklyn, aged thirty-seven years, assistant professor of ophthalmology at Long Island College hos-

pital, died January fourth of lobar pneumonia and diabetes.

Dr. Johannes von Kries, professor of physiology at Freiburg, Germany, whose death was recently reported, was, with professor W. Nagel of Rostock and professor A. Gullstrand of Upsala, an editor of the third edition of Helmholtz's *Physiologic Optics*. He elaborated the "duplicité theory" of the retina, suggested by Max Schultze, according to which the rods perceive light and serve in scotopic vision, while the cones transmit the light and color sensations of photopic vision.

Miscellaneous

The Wilmer Clinic is now completed in all departments, except that of physiological optics.

An eye clinic has been opened in Brazil for the treatment of trachoma.

Mrs. Oscar Johnson and her children, of Saint Louis, have given \$500,000 to the Washington University school of medicine, for an institute of research on eye, ear, nose, and throat diseases, as a memorial to the late Oscar Johnson.

Dr. Adolph Barkan, emeritus professor of ophthalmology of the Stanford University school of medicine, San Francisco, has given \$10,000 to endow the department of history of medicine and natural sciences of the Lane library.

The beautiful building of the Saint Louis Medical Society now has a room specially devoted to the medical history collection recently donated by Dr. James Moores Ball. The collection includes one thousand volumes dating from 102 down to the present year; fifteen hundred medical portraits, many of them copper plates; and several thousand pamphlets, clippings, and reprints dealing with medical history.

A case is reported in the *Journal of the American Medical Association* of a Michigan farmer who was swindled out of \$6,350, by sharpers, for the "purchase of a machine to guarantee saving of the sight" of his daughter's eyes, and for treatment at home for cataract. These fellows must be clever. If any regular ophthalmic surgeon had secured a promise of one thousand dollars for a legitimate cataract operation from a Michigan farmer, this would have been a remarkable achievement.

The medical department of the university of Oregon has divided the department of ophthalmology and otolaryngology into two departments. Dr. John F. Dickson, who for ten years had been at the head of the combined department, has been made an emeritus professor, and is succeeded by Dr. Frederick A. Kiehle, with Dr. Joseph L. McCool as associate clinical professor.

We understand that the postgraduate course given last year at the Gill memorial Eye, Ear, and Throat Hospital, Roanoke, Virginia, will be duplicated in April of this year.

During the month of January, 1929, twenty new paid subscriptions to the *American Journal of Ophthalmology* were received from the Union of Socialist Soviet Republics (Russia).

Societies

The Chicago Ophthalmological Society is sponsoring a course of instruction in microscopy of the living eye. The course is being given at the Rush medical college on Tuesdays at three p.m., by Dr. Robert Von der Heydt.

At the annual meeting of the Chicago

Ophthalmological Society, on January twenty-first, Dr. Charles G. Darling was elected president and Dr. Richard Gamble secretary for the ensuing year. In accordance with the plan adopted a year ago, the new officers assume their duties next October.

At the annual meeting of the Milwaukee Oto-ophthalmic Society the following officers were elected for the ensuing year: president, Dr. R. J. Muenzner; vice-president, Dr. T. F. McCormick; secretary-treasurer, Dr. E. R. Ryan; members of the council, Drs. W. E. Grove and N. M. Black. The scientific program for the meeting was furnished by Drs. J. B. Marks, T. F. McCormick and O. P. Schoofs.

On January twenty-fourth the annual meeting of the Louisville Eye and Ear Society was held at the Pendennis Club. The guest of honor this year was Dr. W. Mithoefer of Cincinnati, Ohio. In addition to the regular membership of the Society many men from out in the state were present as well as a number of the other physicians of Louisville.

Dr. L. W. Morsman of Hibbing, Minnesota, Dr. A. N. B. Lemoine of Kansas City, Missouri, and Dr. C. W. Rutherford of Iowa City, Iowa, were guests at the January meeting of the Sioux Valley Eye, Ear, Nose, and Throat Academy. Dr. Morsman presented a paper on the retrolental space and Dr. Lemoine discussed allergy in ophthalmology. Dr. Rutherford spoke on unilateral congenital paralysis of the motor oculi.

Dr. Arnold Knapp of New York and Dr. Allan Woods of Baltimore will be the guests of honor at the March meeting of the ophthalmic section of the College of Physicians of Philadelphia. Dr. Knapp will present a paper upon the results of his last one-hundred cases of cataract extraction by the intracapsular method with which Dr. Knapp's name has become especially identified. Dr. Woods will address the section upon lens protein. Dr. Charles E. G. Shannon, chairman of the section, will give a dinner for the guests of honor preceding the meeting.

The Minnesota Academy of Ophthalmology and Otolaryngology dined at the Minneapolis Club Friday evening, January eleventh. After the dinner a meeting was held in the Hennepin County Medical Library, at which a paper on physiology and anomalies of the extraocular muscles was presented by Dr. Hendrie Grant of Saint Paul.

A meeting of the section on ophthalmology of the College of Physicians of Philadelphia was held on January seventeenth at the College of Physicians building, when the following program was given: Dr. H. Maxwell Langdon, "Two unusual experiences with infection by streptococcus hemolyticus"; Dr. W. E. Fry (by invitation), "Extensive bilateral retinal detachment with complete reattachment occurring in eclampsia"; Dr. Alfred Cowan, "A visual test card"; Dr. Sidney L. Olsho (by invitation), "A case

January twenty-two was elected secretary and dance with new officers

Milwaukee ing officers ear: president, vice-president, treasurer, council, lack. The g was fur F. McCor-

the annual l Ear So- lub. The W. Mit- addition to ety many resent as sicians of

, Minne- sas City, of Iowa eary meet- ose, and esented a Dr. Le- lmology. congeni-

and Dr. e guests he oph- ysicians resent a ne-hun- by the h Dr. identi- section . Shan- e din- ing the

thalmol- e Min- y elev- s held ibrary, anom- s pre- Paul. almol- Phila- nth at when Dr. H. experi- moly- "Ex- with lamp- ard"; case

of panophthalmitis complicated by pansinusitis," with motion pictures, "A daylight unit for perimeters", and "A screen for perimetry".

The annual meeting of the Oregon Academy of Ophthalmology and Otolaryngology was held at the University Club, Portland, January twenty-fourth. The following officers were elected for the ensuing year: president, Dr. Joseph L. McCool, Portland; first vice-president, Dr. L. O. Clement, Salem; second vice-president, Dr. J. W. McCollom, Portland; secretary-treasurer, Dr. A. J. Browning, Portland. The Academy meets the third Tuesday of each month at Good

On January 16 and 17, 1929, the Western Section of the American Laryngological, Rhinological, and Otolological Society met in Victoria, B.C., under the chairmanship of Dr. Henry M. Cunningham of Vancouver, B.C. Dr. H. V. Würdemann of Seattle demonstrated various details of anatomy, physiology, and pathology of chronic dacryocystitis by means of lantern slides. Dr. Glen Campbell of Vancouver discussed the treatment of dacryocystitis from the viewpoint of the ophthalmologist, Dr. J. T. Dowling of Seattle read a paper on unilateral blindness with recovery after sinus operation, Dr. Ralph A. Fenton of Portland on the present status of the intranasal operations for the relief of optic nerve involvement (discussion opened by Dr. W. F. Hoffman of Seattle), and Dr. F. A. Kiehle of Portland on otitic brain abscess. About thirty members and guests were present.

At the Southern Section of the American Laryngological, Rhinological, and Otolological Society, on January 12, at Texarkana, Arkansas and Texas, Dr. E. C. Ellett of Memphis, Tennessee, read a paper on the relation of optic nerve disease to disease of the nasal sinuses (discussion opened by Dr. J. O. McReynolds of Dallas) and Dr. H. Moulton of Fort Smith, Arkansas, on vertigo as a symptom (discussion opened by Dr. Albert Mann of Texarkana).

The Ophthalmological and Otolaryngological Society of New Orleans holds its regular meetings at the New Orleans Eye, Ear, Nose, and Throat hospital on the third Thursday of the month except in the months of July, August, and September. At its annual meeting held January 17, 1929, the following officers were elected: Dr. M. Earle Brown, president; Dr. Wm. A. Wagner, secretary and treasurer.

The Oregon Academy of Ophthalmology and Otolaryngology extends a cordial invitation to members of the section on ophthalmology and otolaryngology to attend the meeting of the American Medical Association in Portland in July. Information concerning the meeting, not covered by the official bulletin, may be secured by addressing a personal communication to either the president or the secretary of the Academy at Portland, Oregon.

The Società Italiana di Oftalmologia will hold its annual meeting in Rome, on October 22 to 24, 1929.

The Ophthalmological Society of the United Kingdom will hold its annual congress on April 11 to 13, 1929; the section of ophthalmology of the Royal Society of Medicine will have its annual meeting on June 14, 1929; and the Oxford Ophthalmological Congress will meet at Oxford on July 4 and 5, 1929.

Personals

Dr. Harry S. Gradle, of Chicago, has been on a deep-sea fishing trip in Key West. He returns this month.

Dr. Allan Woods, of Baltimore, has moved his office from Park avenue to Cathedral street.

Professor Shiuchi Satake of Keigo, Japan, has recently been a visitor in Baltimore.

Dr. Thomas F. Welsh will practice ophthalmology and otolaryngology in Salt Lake City with Dr. Donohoe.

Dr. William H. Wilder left Chicago in February for Honolulu, where he planned to remain for several weeks.

Dr. William A. Fisher of Chicago is spending about four months visiting the principal university cities of Germany and Austria.

Dr. D. A. Harvey has moved to Salt Lake City and is practicing ophthalmology with the Salt Lake Clinic, succeeding Dr. David W. Henderson, who is now in private practice.

Haywood M. Taylor, chemist for the Fisk Rubber Company, has accepted a position as head of the department of chemistry in the Wilmer Ophthalmological Institute.

Dr. Sanford R. Gifford has been appointed American correspondent on the editorial board of *Klinische Monatsblätter für Augenheilkunde*, succeeding the late Dr. Lucien Howe of Buffalo.

Dr. and Mrs. Howard Ford Hansell recently sailed to spend the winter on the Italian Riviera. They will probably spend the summer in Vittel and return to this country next September or October.

Dr. and Mrs. G. Oram Ring of Philadelphia spent a part of February in Florida.

Dr. and Mrs. W. W. Lewis of Saint Paul spent the month of February in the Canal Zone.

Dr. Joseph L. McCool of Portland, Oregon, was the guest of honor of the Vancouver Oto-ophthalmological Society at its December meeting.

A discussion on the nonsurgical treatment of glaucoma was presented by Dr. Sanford R. Gifford of Omaha as guest at the January meeting of the Saint Louis Ophthalmological Society.

Dr. Frank E. Burch of Saint Paul was guest of honor at the North Dakota Academy of Ophthalmology at its meeting in Fargo on February ninth. The subject of

his address was "Ptosis and comparison of various methods of its correction". Dr. and Mrs. Burch had enjoyed a Caribbean cruise with their son and daughter during the holidays, visiting Panama and Havana.

Dr. L. W. Morsman of Hibbing, Minnesota, spent part of January at Biloxi, Mississippi. On his return Dr. Morsman conducted a course in slit-lamp microscopy, at the university of Minnesota, for advanced students.

At a recent meeting of the Home Teaching Society for the Blind, Dr. L. Webster Fox, of Philadelphia, was reelected president for the year 1929. Dr. Fox has most efficiently served the society as its presiding officer for about ten years. Dr. and Mrs.

Fox lately returned from a midwinter vacation at Port Sewall, Florida.

Dr. Harold Van Cott of Salt Lake City has been appointed second assistant county physician. He will be head of the department of ophthalmology and otolaryngology of the Salt Lake County general hospital, succeeding Dr. Edward LeCompte, who has held that position for the last four years.

Dr. H. P. Wagener, of the department of ophthalmology at the Mayo Clinic, was guest at the January meeting of the eye, ear, nose, and throat section of the Omaha-Douglas County medical society. He presented a very worth-while discussion on retinal arteriosclerosis and arteriosclerotic retinitis.

THIRTEENTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS

September 5 to 13, 1929

The second circular issued for the International Ophthalmological Council and for the national committee of organization of this congress gives a number of important particulars which may be of interest to those who have not yet become members of the congress.

Membership is obtained by sending the equivalent of twenty-five Dutch florins (twenty-five gulden, about ten dollars) to the treasurer of the congress, Dr. H. M. Roelofs, in care of the Incassobank, Heerengracht 531, Amsterdam. Abstracts of symposia and papers will be sent to members or may be obtained on arrival at Amsterdam. (As to subjects which are to be specially reported upon at the congress by committees, see the American Journal of Ophthalmology, 1928, volume eleven, page 598.) After the congress members will be sent detailed reports of the proceedings. Relatives and friends of members of the congress may be registered as associate members on payment of the equivalent of 12.50 gulden (about five dollars). These associate members will have the privilege of attending all receptions and excursions offered to the congress, but will not be admitted to ordinary meetings, nor will they receive reports of the proceedings.

Those wishing to present papers must

send notice to the secretarial department of the Editorial Committee (Wilhelmina Gasthuis, Amsterdam) not later than June first, enclosing short abstracts of their communications. They must also give particulars as to the number and size of lantern slides to be shown and whether an epidiascope or microscope is required for the occasion.

The program of the Congress extends from nine a.m. on Thursday, September 5, to and including Friday, September 13, 1929. On Wednesday, September 11, the congress will move from Amsterdam to The Hague (sightseeing at Haarlem, Leiden, Delft, or Rotterdam optional). On Thursday, September 12, there will be a banquet at the Kurhaus, Scheveningen.

A committee for accommodations (located at the Wilhelmina Gasthuis, Amsterdam) will deal with all inquiries for accommodations (hotel, pension, private house). Rates for single room and breakfast are announced as from the equivalent of six dollars to one dollar. Messrs. Thos. Cook and Son, Ltd., transportation agents for the Congress, head office Berkeley Street, Piccadilly, London, W.1) will undertake to make the easiest and quickest arrangements for conveying individuals or parties to Amsterdam and will reserve accommodations there.

Ladies' committees will be organized in Amsterdam and in The Hague.